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Tumble tOTs: Outcomes of a Gymnastics Program for Children with Disabilities

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TUMBLE TOTS: OUTCOMES OF A GYMNASTICS PROGRAM FOR CHILDREN WITH DISABILITIES

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By

Cayla Leichtenberger

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ABSTRACT

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Despite the benefits, children with disabilities do not participate in recreational activities as often as typically developing peers. The purpose of the program was to: 1) describe the benefit of a gymnastics program on a child's development, and 2) identify the impact of a staff training program. Engagement in the proposed program aimed to ultimately contribute to a child's involvement in recreational activities, health and quality of life (QOL). All participants in the gymnastics program demonstrated a positive change in motor and communication skills. Pre-test data from the staff training program indicated that none of the gymnastics staff members were comfortable in teaching children with disabilities prior to engagement in the staff training program. Results suggest that organizations should make an increased effort to increase the engagement of children with disabilities in recreational programming.

DEDICATION

I would like to dedicate this capstone project to the Occupational Therapy faculty at Duquesne University, especially Dr. Jaime Muñoz, the Department Chair, for their dedication toward my education the past six years. Their effort and enthusiasm inspired me to create a program in order to advance my education and expertise. I would also like to dedicate this project to my fieldwork educators, Katherine Hayes, Daniele Loomis-Rostan, and Becca Kershner, for the commitment and energy while educating me in the clinic in order to advance the application of my knowledge in the field of occupational therapy.

Most importantly, I would like to dedicate this project to my family, especially my mother, brother and grandparents, for their support and guidance. Six years ago, I never imagined that I would earn a Doctorate in Occupational Therapy, however their guidance and support inspired me to strive to my greatest potential. And lastly to my other family members and friends for offering advice whenever it was needed or spending time listening my countless presentations throughout the Capstone process. I could not think of a better group of people to dedicate this project to and am honored to represent these individuals.

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To Dr. Sarah Manspeaker, my expert mentor, for providing expert knowledge regarding the sport of gymnastics and instructing children with disabilities based on her extensive knowledge as an Athletic Trainer. To Thad Turner, my site supervisor, for dedicating time and effort toward my project despite his busy schedule and Warren County Y, for donating the time, space, and equipment to make this capstone project possible. Lastly, I would like to thank all of the parents and participants involved this project for willingness to participate. This project would not have been possible without the assistance from every individual mentioned and so many more.

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LIST OF ABBREVIATIONS

Activity of Daily Living..... ADL

American Occupational Therapy Association ..... AOTA

Americans with Disabilities Act .....ADA

Battelle Developmental Inventory .....BDI

Chief Executive Officer .....CEO

Fundamental Movement Skills .....FMS

Mean .....M

Occupational Therapy..... OT

Person-Environment-Occupation-Performance .....PEOP

Pediatric Evaluation of Disability Inventory .....PEDI

Quality of Life..... QOL

Sample Size.....N

The Practice Scholar Capstone Project

According to the American Occupational Therapy Association (AOTA) (2014), a leisure activity is a "nonobligatory activity that is intrinsically motivated and engaged in during discretionary time, that is, time not committed to obligatory occupations, such as work, self-care, or sleep" (p. S21). Recreational activities are one common leisure children engage in. Recreational activities, such as participating in an organized crafting, sport or club activity, contribute to a child's mental health, attention, motor skills, and social relationships (Chien, Rodger, & Copley, 2017). Recreational activities involving physical activity have the added benefit of increasing a child's health and lifestyle behaviors (Woodmansee, Hahne, Imms, & Shields, 2016). Children with disabilities, however, do not participate in formal, organized recreational activities as often as their typically developing peers, including formal physical or out-of-school activities (Chien et al., 2017; Woodmansee et al., 2016). Common contextual barriers to children with disabilities participating in recreational activities include: environmental, such as the geographical location or the built environment; and personal factors, such as age, disability, or activity preference (Chien et al., 2017). Past research, however, typically focuses on the benefits of recreational activities for children with physical or sensory disabilities. Less research has assessed the benefits of recreational activities for children with intellectual or multiple disabilities.

This quality improvement capstone project took place in a community-based setting at the Warren County Y, formally referred to as the YMCA, in Warren, Pennsylvania. A detailed needs assessment was conducted at the Warren County Y to gain an understanding of the organization's population, existing programs, strengths, and

identified needs. The needs assessment included twenty hours of observation and three hours of semi-structured key-informant interviews (see Appendix A for needs assessment data collection strategies). Observations were completed using observation guides focusing on the population and current programming at the Warren County Y. The doctorate candidate observed the four existing gymnastics programs, a swimming class, and the general Warren County Y environment focusing on the facility's operations and the population typically served. Semi-structured interviews were completed with executive staff members, including the chief executive officer (CEO) and membership coordinator; the head gymnastics coach; and other gymnastics staff members (see Appendix B for sample data collection tools).

The CEO provided insight regarding the mission, vision and goals of the organization, along with his personal opinion of the Warren County Y's past achievements, strengths, and areas of need of the organization. The membership coordinator detailed the population served and current programming offered, as well as membership costs and the areas of outreach. The head gymnastics coach described the gymnastics programs currently offered, the requirements for enrollment in the gymnastics programming, and his personal strengths and weaknesses when instructing children with and without disabilities. Observations and interviews revealed multiple needs at the Warren County Y: 1) additional programming is necessary for children with disabilities, 2) the environment should be made inclusive for individuals of all abilities, and 3) staff education regarding disabilities and environmental adaptations is necessary for successful integration (see Appendix C for a needs assessment infographic).

The Warren County Y currently offers limited programming designed specifically for children with disabilities. Current programming for individuals with disabilities includes the Rainbow Swim and Firefly programs (The Y, 2016). Rainbow Swim is a free weekly, one-hour swimming class offered by the Don Mills Achievement Center, an organization that provides opportunities, funding, and programming for individuals with disabilities in Warren County (Don Mills Achievement Center, 2016). The Rainbow Swim program is designed for any individual with a disability. It focuses on improving motor and social skills by incorporating both swimming lessons and fun in the water (The Y, 2016). Although designed for individuals of all ages, observations during the needs assessment revealed this program is typically utilized by adolescents or adults with disabilities who are on the Special Olympics Swim Team. The children in attendance spent time in the water with their parent or caregiver during the session and spent little time socializing with other participants. The Firefly program is a grant-funded program that introduces adults with intellectual disabilities to a healthy lifestyle and healthy eating habits. This is a recent addition to the Warren County Y, however children do not qualify for the program (The Y, 2016; Time Observer, 2017).

The sport of gymnastics has specific requirements, such as a large gymnasium filled with various specialized gymnastics equipment, creating an overwhelming environment. Typical strategies used during the current gymnastics programming at the Warren County Y include loud, upbeat music and unstructured time for exploration. These approaches, in combination with the equipment requirements of the sport, create a chaotic environment with overwhelming sensory stimulation that may limit the inclusion of all children. Interviews with staff members revealed that children with disabilities do

not typically become or stay involved in the current gymnastics programing due to the overwhelming environment and limited amount staff members (B. See, personal communication, February 6, 2018). The Y, however, has recently taken steps in order to make the environment and programming more accessible, such as building a locker room that is in compliance with the Americans with Disabilities Act (ADA) and adding a fitness class for adults with intellectual disabilities (T. Turner, personal communication, February 6, 2018).

Brian See, the head gymnastics instructor, stated that, in his opinion, gymnastics staff members at the Y do not feel competent or confident in adapting classes or instructing children with disabilities due to a lack of education and training (personal communication, February 6, 2018). Many gymnastics instructors are high school students who have limited experience working with individuals with disabilities. He suggested that education and training for himself and his staff members would allow for the capstone program to be adapted and participants to be integrated into current gymnastics programming upon completion of the project (B. See, personal communication, February 6, 2018).

This capstone project was designed to expand the current programming offered at the Warren County Y. The purpose of the program was to: 1) develop an adapted gymnastics program for children with disabilities with using an occupational therapy framework and process, 2) describe the benefits of a gymnastics program on a child's development, and 3) to identify the impact of a staff training program on a gymnastics staff member's knowledge and confidence in instructing children with disabilities. The proposed program utilized the Person-Environment-Occupation-Performance (PEOP)

theory to address each child or coach's internal factors, the external Warren County Y environment, and the occupation of leisure or work activities in order to impact each paticipant's occupational performance (Cole & Tufano, 2008). It addressed the benefits of recreational activities, specifically gymnastics, using a pretest and posttest design. The Battelle Developmental Inventory (BDI) and the Pediatric Evaluation of Disability Inventory (PEDI) were administered before and after the intervention was provided through the gymnastics program in order to measure the intended outcomes of the program (Braveman, Suarez-Balcazar, Kielhofner, & Taylor, 2017). Staff training for the existing staff members regarding disabilities and techniques to adapt existing programming was intended to increase their competence and confidence in serving children with all abilities and assist the organization and program in serving a larger population.

Review of Relevant Literature

OT is a healthcare profession that focuses on helping individuals across the lifespan participate in the daily activities, or occupations, that they want and need to do. An occupational therapist helps to promote health or adapt an injury, illness or disability into daily life to increase an individual's QOL (AOTA, 2018b). In pediatric practice, OT aims to address motor, cognitive, sensory processing, communication or play skills in children with a developmental delay to enhance development, lessening the influence of the delay on the child's future (AOTA, 2018a).

Motor delays have a significant impact on a child's future, potentially limiting their physical, social, and emotional functioning throughout life, as well as their involvement in sports or physical activities (Kirk & Rhodes, 2011; Temple, Naylor,

Rhodes & Higgins, 2009). Motor skills, specifically, play an important role in a preschool-aged child's development, or a child age 3-5. Children develop fundamental movement skills (FMS) that are the foundation to all other motor skills at age 3-5 years old. FMS consist of specific locomotor skills, including running, hopping and jumping; object control skills, such as throwing and kicking; and body management skills, including balancing, climbing, or rolling (Stodden et al., 2008). These foundation skills support participation in more complex motor skills, such as engagement in sports and physical activity, throughout life (Temple et al., 2009). Children who demonstrate an increased amount of FMS typically engage in additional sport activities, avoid injuries, and live an active lifestyle compared to children who do not demonstrate FMS (Coelho, 2010). FMS also contribute to a child's functioning in daily life (Piek, Hands & Licari, 2012). FMS contribute to a child's emotional function, as well, as children who have motor delays often withdraw from activities that require motor skills, such as baseball or gymnastics programs. This, in turn, impacts a child's self-esteem, self-worth, and level of anxiety and depression (Piek et al., 2012).

FMS, however, do not typically develop naturally, but require time, instruction, and support from parents, teachers, health professionals, or other adults (Stodden et al., 2008). Children with developmental disabilities often require increased support compared to their typically developing peers due to their lack of motor skill competency. These children require increased opportunities, interventions and instruction to develop the FMS that support future motor involvement (Kirk & Rhodes, 2011; Temple et al, 2009). For example, gross motor activities, such as walking on a balance beam, jumping up and down from an elevated surface, or standing on one leg, are pertinent skills to address, as a

lack of these basic motor skills during preschool years is associated with the lack of future involvement in physical activity and participation in sports activities (Queensland Government, n.d.; Telama et al., 2005).

Recreational activities, such as gymnastics, contribute to a child's mental health, attention, motor skills, and social relationships, in addition to physical recreational activities contributing to a child's health and lifestyle behaviors (Chien et al., 2017; Woodmansee et al., 2016). Physical activity also has identified cognitive benefits, including an impact on a child's executive functioning, working memory, cognitive flexibility, self-regulation, and attention, as motor development and cognitive development have been shown to be interrelated (Diamond, 2000; Zeng et al., 2017). Both motor and cognitive skills impact a child's ability to sequence, plan, and monitor. These cognitive benefits have a positive impact on a child's attention, classroom behavior, and academic achievement later in life (Zeng et al., 2017).

Although beneficial, children with disabilities do not engage in organized recreational activities or formal out-of-school physical activities as often as their typically developing peers (Chien et al., 2017; Woodmansee et al., 2016). In addition, children with intellectual or developmental disabilities are less physically active compared to typically developing children, increasing their risk for developing obesity or other health-related problems, as decreased activity during childhood years has been linked to progressive inactivity and obesity (Culjak, Miletic, Kalinski, Kezic & Zuvela, 2014).

Providing children with the skills to engage in physical activities, such as introducing the child to the basic skills of gymnastics, in addition to the confidence and motivation to participate, increases a child's overall competency in engagement in

physical activities (Collins & Staples, 2017). According to a developmental model developed by Stodden et al. (2008), as a child gains basic motor skills, he or she will gain the competence to engage in other physical activities, impacting the child's overall health and well-being. Focusing on motor skills during early childhood via this proposed program will give the child the skills, abilities, confidence, and motivation to engage in a greater variety of leisure activities later in childhood and adolescence (Stodden et al., 2008).

Early childhood is a crucial period for intervention, as this is a rapid period of motor and cognitive development as the brain grows and develops (Zeng et al., 2017). Intervening during early childhood, known as early intervention, can minimize or remediate developmental delays, improve daily functioning, and promote participation in health-promoting behaviors across the lifespan (Kirk & Rhodes, 2011). Early intervention is a crucial service, as a delay in motor skills has a significant impact on a child's future physical, social and emotional development (Kirk & Rhodes, 2011). A variety of intervention techniques and strategies exist. These include, but are not limited to, using a child-directed approach or an instructor-directed approach, both of which address foundation skills in order to impact future development (Kirk & Rhodes, 2011). Motor impairments have been shown to impact a preschool age-child's academic, social, and emotional functioning. The early identification of and intervention for a child's motor impairment is important to address prior to their enrollment in school to decrease the influence on their cognitive, academic, social and emotional development (Piek et al., 2012).

In typically developing children gymnastics has been found to address motor competence, such as stability, eye-hand coordination, bilateral coordination, balance and manual dexterity (Hseih, Lin, Chang, Huang, Hung, 2017). Gymnastics introduces a child to a variety of movement patterns and skills with an increased attention on static and dynamic balance, both of which help facilitate an increase in body awareness (Coelho, 2010; Sands, 1999).

Gymnastics emphasizes body postural orientation and postural equilibrium, both of which contribute to one's postural control. It also introduces children to a variety of sensory experiences, including visual, vestibular, and somatosensory experiences, all of which are integrated into one's motor skill development. Past research indicates that gymnasts demonstrate better postural control compared to peers who are not involved in gymnastics activities. These children also demonstrate the ability to integrate visual information to improve their postural control better compared to their non-gymnast peers (Garcia, Barela, Viana, & Barela, 2011). The combination of motor skills and sensory experiences contributes to postural control, a necessary skill needed in order to navigate one's everyday environment.

In addition, gymnastics impacts a child's skeletal development and social behavior (Karachle, Dania, & Venetsanou, 2017). Gymnastics influences a child's working memory and promotes increase attention, both valuable skills that foster a child's development and academic learning (Hseih et al., 2017). For example, obstacle courses, a common activity utilized in gymnastics instruction, increase a child's exposure to FMS and promote increased problem solving and motor planning (Coelho, 2010).

According to Piek, Hands, and Licari (2012), children with increased opportunities that support skill development are more likely to become competent in movement skills. Children who are not exposed to supportive environments, however, have limited opportunities for social interactions and do not have the opportunity to gain pertinent motor skills and develop confidence in their skills and abilities (Piek et al., 2012). The gymnastics environment can be easily adapted and graded to meet the skills and demands for each individual child, increasing the opportunities and likelihood that the child is able to acquire new skills.

Past research indicates that gymnastics is an effective activity that promotes the development of FMS. Basic gymnastics skills include rolling, balancing, swinging, climbing, and landing, all of which are identified FMS that a child gains between the ages of three and five years old (Coelho, 2010; Stodden et al., 2008). Continued practice of gymnastics skills improves locomotor FMS, further contributing to the overall advancement of FMS (Culjak et al., 2014). Gymnastics gives children the opportunity to develop the FMS that will support an active lifestyle (Coelho, 2010).

Staff training can also impact the inclusion of children with disabilities into mainstream recreational classes (Scholl, Smith, & Davison, 2005). Training staff in knowledge and skills is crucial for a staff response; however, training focused only on knowledge is not adequate to changing the behavioral response of staff members (Ling & Mak, 2012). Additional opportunities, such as hands-on practice or a mentorship program, offer increased opportunities for staff to gain confidence in serving a larger, underserved population. Overall, staff education and training increase the quality of service provided, in addition to increasing the confidence for service implementation

(Dowey, Toogood, Hastings, & Nash, 2007; Scholl et al., 2005; Tierney, Quinlan, & Hastings, 2007).

Although a significant amount of research currently exists regarding the benefits of engagement in physical or recreational activities during childhood, limited research has studied the specific benefits of a gymnastics program on a child's global development (Woodmansee et al., 2016). In addition, the available research does not typically use a theoretical framework, making this research less rigorous (Kirk & Rhodes, 2011). Kirk and Rhodes (2011) state that improvements in motor skills are expected to be more significant when a specific theoretical framework is followed, such as the PEOP frame of reference utilized in this program. Lastly, limited research on gross motor skills involves the parents in the direct delivery and intervention design, suggesting the use of a narrow setting. The use of multiple settings, such as a community and home setting, will help to strengthen the importance of the early intervention of gross motor skills (Kirk & Rhodes, 2011). The quality improvement project will address this gap in the literature in order to contribute to the field of evidence-based occupational therapy practice (see Appendix D for key studies informing the study).

Due to the lack of current gymnastics programming for children with disabilities and lack of staff education at the Warren County Y, children with disabilities are typically not involved in gymnastics classes, as identified in the needs assessment process (B. See, personal communication, February 6, 2018). Serving this population will increase the variety of opportunities for children with disabilities in the Warren County area and at the Warren County Y, in addition to impacting their cognitive, social and daily living skills and overall health and well-being.

There is clear evidence that gross motor skills impact a typically developing child's physical, social, and emotional functioning throughout life (Kirk & Rhodes, 2011). This program sought to understand if gymnastics can have a similar impact on children with disabilities. Using gymnastics techniques in combination with an occupational therapy framework, the project addressed cognitive, social, and daily living skills via gymnastics opportunities while enhancing overall participation in leisure activities. This quality improvement project sought to determine if sports-based leisure activities could improve overall cognitive, social, and daily living skills in preschool-aged children with developmental disabilities. It also sought to understand if a staff training program could increase a staff member's knowledge, confidence, and competence in instructing children with disabilities in the existing gymnastics programs.

Capstone Project Methods

Project and Setting

Tumble tOTs: Outcomes of a Gymnastics Program for Children with Disabilities was a quality improvement program that extended the current programing offered at the Warren County Y. This facility currently offers four mainstream gymnastics programs but does not offer a gymnastics program designed specifically for children with disabilities.

Program Description

Population. A developmental delay, or a delay in one or more areas of function, including cognitive, physical, sensory, communication, social/emotional, or adaptive development, currently impacts 37.6% of children with disabilities age three to five in Pennsylvania (Pennsylvania Department of Education, 2007; U.S. Department of

Education, 2017). This quality improvement program was designed to provide a gymnastics program for children ages 3-5 years old with developmental disabilities and a staff training program for the existing gymnastics staff members.

A small target sample size (6-10 children) was preferred in order to increase the instructor to child ratio. Participants of the gymnastics class qualified for the program if they met the following criteria: age 3-5 years old, a diagnosis of developmental disability, ambulatory, able to follow one-step directions ("go," "stop," etc.), and able to complete a toileting routine with minimal assistance from the caregiver. The doctorate candidate and each child's caregiver had a phone conversation to screen each child to assure they met the qualifications for the program (see Appendix F for a participant screening questionnaire). This also gave the doctorate candidate an opportunity to explain the program to each family member. All gymnastics staff members were invited to join the staff training sessions via an email distributed by the head gymnastics instructor and invitation to join a private Facebook group.

Participants of the gymnastics class were recruited using convenience and snowball sampling methods via flyers (see Appendix E for a sample gymnastics recruitment flyer). Flyers were posted at the Warren County Y and other locations in Warren County, including the Warren County Library, multiple preschools, the Jefferson Defrees Family Center, the Don Mills Achievement Center, and the Warren General Hospital RehabWorks Outpatient Center. The Warren County Y distributed flyers to every child in their childcare program. Electronic flyers were posted on the Warren County Y's website and Facebook page, along with the Warren County Special Olympics and Warren County Headstart Program Facebook groups. Gymnastics staff members

were recruited through the head coach of the Warren Gymnastics Team, Brian See. A brief handout outlining the objectives of the program and the days and time was also provided to each staff member.

Primary goals and objectives of the program. There were four established goals for this project: three focusing on the outcomes of the gymnastics program and one focusing on the outcome of the staff training program. The primary goals for the gymnastics program were to increase the participants' daily living, social communication, and cognitive skills to support the engagement in functional activities and daily life. The staff training program had the primary goal to improve their ability to identify and implement strategies that can support a more inclusive environment for the participation of children with disabilities in gymanstics programs at the Warren County Y (see Appendix G for the program goals).

Program structure. There were two main components of this program (see Appendix H for a conceptual model of the program). The first component was a gymnastics program was designed for children with disabilities, focusing on addressing goals related to daily living, social communication, and cognitive skills. Gymnastics classes were held for five weeks (10 sessions) with the recommendation that each child attends at least eight sessions. Sessions were offered two times a week for 45 minutes, mirroring the structure of the existing gymnastics programming. Typical activities included: a warm-up game, stretching, activities on each gymnastics apparatus, strengthening, and trampoline (see Appendix I for a sample session plan). Sessions were focused on motor, cognitive, social, and daily living skills.

The second component of the project was a staff training program to increase the lack of knowledge, confidence, and competence in instructing children with disabilities. A blended learning method was utilized including both online instruction and a traditional face to face instruction. This method allowed for synchronous face-to-face interaction, but also asynchronous online learning, increasing the flexibility of access for each participant. The online component permitted each participant go at their own pace when it was convenient in their natural context, but the traditional method allowed for the valuable skills gained in face-to-face learning. A blended method is considered an enhancement rather than a replacement of face-to-face learning, benefitting both the participants and the facility, as it saves both time and money for both individuals (Means, Toyama, Murphy, & Baki, 2013). All participants had access to the computer lab at the Warren County Y to assure all participants in the gymnastics and staff training program had access to the necessary technology (Forsyth & Kviz, 2017)

Four interactive staff training lectures focused on disabilities, behavior management, and environmental adaptations were offered online via Edpuzzle, as continued staff training sessions are more effective than one single session (Ling & Mak, 2012). Each gymnastics staff member was asked to attend and observe four Tumble tOTs gymnastics sessions to gain an understanding of the structure, activities, and strategies utilized by the doctorate candidate (see Appendix J for sample activities and strategies utilized). A 15-minute in-person wrap-up conversation was held for the staff members after each gymnastics session to allow for questions and discussion of the content offered in the online training for that given session. All staff members were encouraged to

engage in the staff training program by the doctorate candidate and their supervisor at the Warren County Y.

The doctoral candidate designed four online training sessions that were intended to maximize the effectiveness of the observation sessions. The first session focused on knowledge regarding disabilities, as training in knowledge and skills is crucial for a staff response (Ling & Mak, 2012). The following two sessions focused on behavioral management strategies and adaptations for children with disabilities using a case study video format, as only knowledge training is not adequate to changing the behavioral response of staff members (Ling & Mak, 2012). The last session was a wrap-up to review the content and assure all staff members gained knowledge and competence in serving this population. Overall, staff education and training intended to increase the quality of service provided at the Warren County Y, in addition to increasing the confidence for service implementation (Dowey et al., 2007; Tierney et al., 2007).

Theoretical framework. The Person-Environment-Occupation-Performance (PEOP) theory, an occupational therapy model, guided program design for both aspects of this project. According to PEOP, functional occupational performance occurs when there is an adaptive relationship between the person, environment, and occupation (Cole & Tufano, 2008).

Within this model, the person is the child with developmental delay who may have a variety of cognitive, physiological, psychological, neurobehavioral, and spiritual factors. The child's physiological, or physical health and fitness; cognitive, or their attention and memory; and psychological factors, including their personalities and motivation, all interact to make up each child's skills and abilities.

The environment can include the physical/built, natural, cultural, societal, social interaction, and social and economic systems contexts where the child engages in their chosen occupations. For example, the built environment of the Warren County Y, including the gymnasium and gymnastics equipment, is part of the physical environment required for a child to engage in gymnastics programming. The cultural environment also contributes to the environment. This can include the beliefs and customs regarding the integration of children with disabilities into mainstream classes. For example, the staff participating in the staff training program gained exposure to the possibilities for increased programming for children with disabilities at the facility. This, in turn, impacted their attitudes and beliefs toward integrating children with disabilities into mainstream programming. Access to programming at the Warren County Y impacts each child and makes up the social and economic system aspect of the environment. This program increased the access to programming developed specifically for children with disabilities, impacting the social system of the environment.

Lastly, occupations, such as leisure or play activities, are the daily activities that a person engages in. The leisure activity of a recreational gymnastics class consists of abilities, or the intrinsic factors of a person; actions, or observable behaviors; tasks; occupations; and social and occupational roles. The interaction of the person, environment, and occupation creates a person's occupational performance which shapes one's roles in their daily life (Cole & Tufano, 2008). For example, the interaction between the child, the Warren County Y environment and their engagement in leisure activities shapes their overall performance and role in their chosen daily activities.

Program implementation. Implementation of this program occurred over 16 weeks beginning May 14, 2018. The first six weeks focused on participant recruitment and creation of program materials, including session plans, staff training session materials, and a staff knowledge exam. Week seven and eight focused on participant evaluation to gain a better understanding of each child's developmental level and each staff member's knowledge. The researcher administered baseline assessments with the gymnastics and staff participants. The knowledge exam created for the staff training program was piloted on staff members from the cheerleading program during week eight, as well, to assure participants could understand each question and respond accordingly (Forsyth & Kviz, 2017). The instructions were slightly altered based on feedback received from the pilot exam; all other components of the knowledge exam remained the same.

Gymnastics and staff training sessions occurred during week 9-13. Participants in the gymnastics program were encouraged to attend at least eight of the 10 sessions. Staff members were encouraged to attend four staff training programs. Assessment measures were re-administered during week fourteen. Parent and staff satisfaction surveys were also distributed during week fourteen. Program wrap-up, including data analysis of assessments and survey results, occurred across weeks 15-16 (see Appendix K for a program implementation timeline).

The Warren County Y's gymnasium and gymnastics equipment were used for implementation of this program; additional physical materials, such as bean bags, puzzles, or games, were provided by the doctorate candidate. The Y had a wide variety of gymnastics equipment and materials, making activities easily adaptable to each child's

specific abilities (see Appendix L for typical gymnastics equipment utilized). A fourth-year occupational therapy student from Duquesne University volunteered as an assistant coach for the implementation of the gymnastics program. The assistant coach aided during the gymnastics class to increase the staff to participant ratio. The assistant coach was trained regarding basic gymnastics skills but was not expected to grade activities during the class; the doctorate candidate's occupational therapy knowledge guided all program adaptation. Staff education sessions occurred online with an in-person observation component. Key points from the online lecture were reinforced within the on-site training session. Supplemental training materials, such as handouts, were provided in written and electronic formats, when necessary.

Program evaluation tools. Multiple tools were used to measure program outcomes. The BDI is a standardized comprehensive, norm-referenced battery assessment tool that determines a child's developmental level, or those at-risk of a developmental delay, across five domains: adaptive, personal/social, communication, motor, and cognitive (Newborg, Stock, Wnek, Guidubaldi, & Svinicki, 1984). Administration can be standardized, observation, and/or interview (Cunha, Berkovits, & Albuquerque, 2018). Items were administered in accordance with the manual using either a standardized or standardized interview method. For example, items regarding their performance with peers were administered in an interview format, whereas motor items were administered in a standardized format.

Items in this assessment were scored if the child did not exhibit the skill (0), if the skill is emerging (1), or if the skill is fully developed (2). Normative data is based on a standardized sample of 800 children ages 0 to 7 years 11 months using a stratified quota

sampling method. The test-retest reliability of the total BDI score ranges from 0.97-0.99 for this specific age group across a 4-week period, assuring that administration at two points in time would yield reliable results. A vigorous development process of the tool assured that its content is valid (Gibbs, 1990; Newborg et al., 1984). Both construct and content validity were established by comparing the BDI to other standardized assessment tools. Authors indicate high correlations, however additional studies should be completed in the future to establish further validity correlations (Newborg et al., 1984).

The PEDI, a standardized checklist and rating scale, assesses functional abilities, caregiver assistance, and modifications across three domains: mobility, self-care, and social function. It was developed to determine a child's developmental level, monitor progress, or complete a program evaluation (Richardson, 2015). The PEDI was completed by each child's primary caregiver to help determine each child's developmental level and individualized strengths and deficits in their home environment. The internal consistency is 0.95-0.99, indicating the items measure the same characteristics, and its test-retest reliability is high, indicating consistency with repeated administration. PEDI results are correlated with those of the BDI, with a concurrent validity of 0.80-0.97, making it an appropriate choice for the purpose of this program (Haley et al., 2014).

A knowledge exam was developed by the doctoral candidate to assess each staff member's knowledge regarding instructing children with disabilities, including their understanding of a diagnosis or possible environmental adaptations that might be necessary, such as how to decrease in sensory stimuli in the environment. Literature and past research informed the development of this tool to assure it measured the intended

outcomes. The reading level of the population and the language used was taken into consideration when developing this tool. All information on the exam was related to the content in the training sessions, including disability awareness, challenging behaviors, and environmental adaptations (see Appendix M for the questions on the staff knowledge exam) (Doll, 2010). This exam was piloted on a group of staff members at the Warren County Y to assure participants understood each question and were able to respond accordingly. Debriefing questions were included at the completion of the pilot exam for participant feedback (Forsyth & Kviz, 2017).

Surveying methods were used to gather data related to process evaluation. This method helped the doctorate candidate understand valuable descriptive information regarding the participants' perspective of the program (Braveman et al., 2017). It accounted for participation in the program while being culturally sensitive to the differences in the group in an inexpensive manner (Portney & Watkins, 2009a).

The primary parent or guardian of each child that participated in the gymnastics program and each gymnastics staff member in the staff training program were data sources used to answer process evaluation questions. Other records included as sources of data included an intake demographic questionnaire and attendance records from both the gymnastics program and staff training program (see Appendix N for a participant demographic survey).

Evaluation process. In order to gain an understanding regarding the demographics of the target population participating in the gymnastics program, the following topics were included in a brief intake demographic questionnaire: name, age, sex, ethnicity, medical diagnosis, school/grade (if applicable), and if the child had

previously taken a gymnastics or other recreational class (Doll, 2010). Each parent or guardian was administered the questionnaire during their child's individual evaluation.

Both outcome and process evaluation occurred throughout the entire 16-week program (see Appendix O for an evaluation process timeline). A pretest-posttest design was utilized to complete the outcome evaluation process. The BDI and PEDI were administered to measure the intended outcomes before and after the intervention was applied to answer questions regarding improvement or change due to the intervention. Both measures were administered at week 7-8 and week 14 to each participant. Administration took place at the Warren County Y in a preschool classroom or the childcare room. This environment was free of distractions to provide an optimal evaluation environment. In addition, each parent/caregiver was asked to complete necessary paperwork to fulfill the Warren County Y and the capstone program's requirements, including a photo release, liability, and insurance form.

Clinical observations were also recorded by the doctorate candidate throughout the 5-week gymnastics program. This descriptive data was supportive of the change observed in each participant. For example, the assistance level needed for each child to remove their footwear at the beginning of each session was recorded in order to track the progress each child made toward reaching the previously stated goals and objectives. This documentation was recorded in a notebook and compared across the entire 5-week session.

Data regarding each staff member's knowledge and skills was recorded via a knowledge exam. One pre- and post-test knowledge exam was administered before and after the staff training program. This sought to allow the doctorate candidate to gain an

understanding of the knowledge and skills gained by participating in the staff training program to determine the effectiveness of the program.

Electronic surveys were administered to each caregiver and staff member using a secure portal to answer all process evaluation questions (see Appendix P for a sample parent satisfaction survey and Appendix Q for a staff satisfaction survey). An electronic format increased the speed of delivery and completion, as well as the efficiency of data analysis. All participants were able to use the computer lab at the Warren County Y to assure all had access to the necessary technology (Forsyth & Kviz, 2017). Paper surveys were also available for each participant. In order to assure the surveys are reliable and valid, the doctorate candidate included several similar items to account for the entire variable. Questions mirrored exactly what the doctorate candidate was interested in investigating; no assumptions were made and questions were short with only one component (Forsyth & Kviz, 2017).

Data analysis. All data gathered from the BDI, PEDI, and staff knowledge exam was coded in a Microsoft Excel spreadsheet. This aided in organization and the statistical analysis process. All clinical observations related to the program outcomes of the gymnastics sessions were recorded in a notebook. Due to the relatively low sample size, a Wilcoxon signed-ranks test was performed using SPSS software to analyze the statistical difference between the pre- and posttest quantitative measures, or the outcome evaluation methods. This test demonstrated the direction of change and the amount of difference between the measure at two different points in time for each individual child and staff member (Portney & Watkins, 2009c).

Qualitative data gathered via the surveys was analyzed using categorical indexing beginning with a literal and then interpretive review of the open-ended responses from the survey. This continuous review represented a reflection of the presented data and culminated in the development of categories. Coding was managed using a word document to assure organization and consistency (see Appendix R for a sample coding sheet) (Richards & Morse, 2007). Data analysis was complete when the doctorate candidate created a structured data set that summarized categories for the entire group for both the gymnastics and staff training program.

Summary. In summary, the proposed program addressed both the gap in programing offered at the Warren County Y and the gap in current literature. This program addressed the identified needs of the Warren County Y and the intended population. As previously noted, OT interventions and gymnastics techniques and activites, when used in combination, can address performance skills and gross motor skills, such as stability, eye-hand coordination and balance, while contributing to a child's overall physical health and engagement in leisure activities (AOTA, 2014; Hseih et al., 2017). Gymnastics also impacts a child's working memory and promotes increased attention, both valuable skills that foster a child's development and academic learning (Hseih et al., 2017). Engagement in the program aimed to ultimately contribute to many aspects of a child's life, but specifically each child's overall health and QOL (Chien et al., 2017).

Results

Broad Overview of Findings

This program was implemented by the doctorate candidate as planned at the Warren County Y. Both the gymnastics and staff education programs were held across five weeks with assessment measure administration occurring before and after participation in each program. Results from the assessment measures made it possible to draw conclusions regarding the outcomes of each programs.

All participants in the gymnastics program demonstrated a change in motor and communication skills. At least one participant demonstrated a positive change in each BDI domain across all four domains; at least two participants demonstrated a positive change in three domains. The greatest average amount of change between pretest and posttest scores was observed in the motor (9.3) and communication domains (9.3) of the BDI, with cognitive (2.7) and personal-social (1.8) following.

Pre-test data from the staff training program indicated that none of the gymnastics staff members in the staff training program were comfortable or confident in serving children with disabilities prior to engagement in the staff training program. Conclusions regarding the effectiveness of the staff training program could not be made due to a lack of participation in post-test measures.

Gymnastics Program

Description of the participants. Thirty-two individuals expressed interest in joining the gymnastics program with eight qualifying to participate. After a brief screening survey with each primary caregiver, four participants (N=4; two males, two females) age 3-5 years old (median: 3 years, 11 months) were included in the program.

Twenty-four participants were excluded from the program due to the age qualification inclusion criteria. Of the eight eligible participants, four were not able to participate due to the time of day the program was offered.

All participants in the gymnastics program lived in Warren County and had no previous experience participating in a gymnastics program. Participants were not enrolled in another recreational activity or receiving therapeutic services while participating in the gymnastics program. Half of the participants were existing members of the Warren County Y. Each participant in the program had a different medical diagnosis, described in Table 1.

Table 1

Participant Demographics

Participant	Diagnosis	Gender	Age*
1	Cystic Fibrosis	Female	50
2	Arthrogryposis	Female	44
3	Autism Spectrum Disorder	Male	44
4	Attention Deficit Hyperactive Disorder and Obsessive-Compulsive Disorder	Male	52

Note. *age reported in months

Description of findings. Ten regularly-scheduled gymnastics sessions were held over a five-week period; make-up sessions were not offered due to time constraints. Two participants attended ten sessions, one participant attended eight sessions and one participant attended six sessions; three participants attended the recommended amount of sessions (8 sessions). The average number of gymnastics sessions attended was 8.5 sessions.

The BDI and PEDI were administered to all participants in the gymnastics program one to two weeks prior to the first gymnastics session (M: 12.5 days) and upon

completion of the last gymnastics session (M: 9.75 days). Each child was evaluated individually by the doctorate candidate. Each child's caregiver was present in the room during the evaluation process.

The personal-social, motor, communication, and cognitive domains of the BDI were administered in a standardized and standardized interview format in the manner described in the assessment manual. Each child's raw score from each domain was calculated and recorded on the evaluation form and a Microsoft Excel spreadsheet. Raw scores were utilized to calculate each child's percentile rank, standardized score, and age equivalent value. Part I: Functional Skills of the PEDI was completed independently by each child's parent/caregiver. A raw score for each domain (self-care, mobility, social function) was calculated. Raw scores were converted into normative standard scores with a standard error and scaled scores with a standard error.

A Wilcoxon signed-ranks test revealed that, across the four domains of the BDI administered, at least two participants demonstrated a positive change in three domains. At least one participant demonstrated a positive change in BDI score in each specific domain across all four domains. The greatest average amount of change between pretest and posttest scores was observed in the motor (9.3) and communication domains (9.3) of the BDI, with cognitive (2.5) and personal-social (1.8) following. Overall, a Wilcoxon signed-ranks test revealed that the results in the motor and communication domains of the BDI were approaching significance (0.066 and 0.068, respectively).

The PEDI yielded fluctuating results collectively; a positive average amount of change was only observed in the self-care domain (4.4) (see Appendix S, Table 2 for the Wilcoxon signed-ranks test for the BDI and PEDI assessment measures). Both the

mobility and social function domains of the PEDI yielded a negative amount of change between the pretest and posttest measures (-2.2 and -2.1, respectively) (see Appendix T, Table 3 for each participant's standard BDI T score and PEDI normative standard score before and after participation in the gymnastics program and Appendix U for a histogram of the BDI domain results).

Staff Training Program

Description of the participants. Six gymnastics staff members were enrolled in the staff training program. Five were female and one was male with the average age of 22 years old (range: 15-45 years old). None had been previously enrolled in a staff training program that sought to increase the engagement of children with disabilities in recreational programs.

Four staff training sessions were held. Three participants attended four sessions, two participants attended two sessions, and one participant attended one session. The average number of staff training sessions attended was 2.8 sessions.

Description of findings. Each staff member completed a pre-test knowledge exam prior to attending the first staff training session. The average score on the pretest knowledge exam was a 21 out of 30 (70%), with a range of 17-26. Each staff member was highly encouraged by the doctorate candidate and their supervisor, the Wellness Director at the Warren County Y, to complete a posttest knowledge exam upon the completion of the last session, however no staff member participated. Conclusions about the results of the staff training program, therefore, could not be made due to a lack of participation in post-test measures.

On average, participants in the staff training program have been employed by the Warren County Y as a gymnastics staff member for approximately four years. Staff reported serving 3-5 children with a disability in the existing gymnastics classes since starting their position. On average, the staff indicated they are not comfortable or confident in serving children with disabilities. Only one participant reported being comfortable integrating children with disabilities in the existing programs. Three participants reported being confident in adapting the environment for children with disabilities.

Discussion

In this capstone project, the doctorate candidate was interested in gaining an understanding of the impact a recreational gymnastics program had on a child's development and a staff training program had on an existing staff member's knowledge and confidence in instructing children with disabilities. A gymnastics program designed for preschool-aged children was a fun, motivating way to address motor skills, but also personal social, cognitive, and daily living skills (Karachle et al., 2017).

Two of the four goals of this program were achieved: goal one related to activity of daily living skills and goal two related to social communication skills. Goal three related to cognitive skills and goal four related to the staff training program were not met. The doctorate candidate was able to infer that engagement in the gymnastics program supported a child's development of motor, social and daily living skills. The doctorate candidate was not able to draw conclusions of the effectiveness of the staff training program in accomplishing goal four of the program due to the lack of staff participation in the post-test assessment measures.

Interpretation of Results

Gymnastics program. The first discussion point is related to the data gathered regarding the impact a gymnastics program had on a child's development upon completion of the five-week program.

Motor skills. A program goal stating an increase in motor skills was not specified, however a gain in motor skills supports a gain in global development, making it an important discussion topic (Kirk & Rhodes, 2011; Temple et al., 2009). All participants demonstrated a change in their BDI motor score supporting that engagement in a basic gymnastics program supports the development of FMS, including rolling, swinging, climbing, and landing (Coelho, 2010; Stodden et al., 2008). Clinical observations support BDI results in the motor domain. For example, all participants required maximum assistance and unlimited verbal cues to complete a forward roll at the start of the program. Upon completion, all four children could independently complete this basic gymnastics skill. This outcome is also reflected in the positive change in the motor domain of the BDI.

The two participants that demonstrated the most change in the motor domain of the BDI both attended all ten sessions, whereas the other two participants who attended less sessions demonstrated less change. The participants that did not attend the recommended amount of sessions demonstrated minimal change, suggesting that increased participation in the gymnastics program supported increased motor skills.

Only one participant demonstrated a change in the scaled mobility score of the PEDI that was beyond the minimally detected change (Iyer, Haley, Watkins, & Dumas, 2003). This participant, participant two, had a physical disability; the participant had a

significantly lower PEDI mobility score at the pre-test measure compared to the other participants (approximately 30 points). Upon completion of the program, her score was similar to the other participants in the program, suggesting that engagement in the gymnastics program supported a gain in motor skills. Her peers were also utilized as a model for how to complete the activity; she was able to watch her peers complete an activity first in order to understand how someone typically performs the activity. This peer model format gave her an opportunity to watch her peers and adapt the activity to her disability to successfully complete the same activities they were completing (Jones & Schwartz, 2004).

Although the results of the BDI motor domain and PEDI mobility score appear to be conflicting, it is important to note that the BDI is a therapist administered measure and the PEDI is a parent-report measure. It is possible that the parents of the participants were not able to observe or recognize the emergence of motor skills, whereas the doctorate candidate has the training and knowledge to detect this gain in skills. The BDI, in this instance, could be more sensitive to minimal change. The BDI motor domain, for example, has specific administration guidelines that take the assistance level, amount of time, and number of trials into consideration when measuring a basic motor skill, such as the ability to walk down stairs with alternating feet (Newborg et al., 1984). The PEDI, however, measures the child's ability to complete functional mobility with less specifications, such as a child's ability to walk down a partial flight of stairs (Haley et al., 2014). Although they both suggest that a child can navigate their environment, the BDI measures the specific foot pattern a child utilizes to complete the task which might not be

obvious or noted as important to a parent. Results, therefore, are not contradicting, but rather consider the impact of a therapist versus parent report measure.

This differentiation in results could also be due to other reasons. Parents completed the PEDI self-report measure independently, potentially limiting their understanding regarding the test items, as parent report measures have limitations to gathering reliable data (Taylor, 2017). Parents also may not have been actively present in their child's daily routines, making their report of their child's abilities invalid and unreliable for the purpose of this project. Lastly, the parent may not fully remember what their child could and could not independently complete in their daily life at the time they completed the PEDI.

The parent of the three participants that attended the recommended amount of sessions agreed that they noticed a difference in and carryover of their child's motor skills upon completion of the gymnastics program. The parent of the participant that did not attend the recommended amount of sessions reported that he did not notice a difference in his child's motor skills. One parent recalled that her daughter had always been fearful to jump off of elevated surfaces. She would require hand held assist and unlimited verbal cues in order to jump out of their vehicle, for example. The doctorate candidate also noted this fear at the start of the program; when jumping off of the balance beam the child would state "too high" and required hand-held assist, unlimited verbal cues and a peer demonstration to complete the task. After increased opportunities to engage in jumping activities, such as jumping off of different elevations and widths, the participant independently jumped from the balance beam without verbal cues or physical assistance. This skill was also able to be generalized to her home environment, as her

primary caregiver reported that, upon completion of the program, she independently jumps out of their vehicle without hesitation, making both the child and the parent's morning routine easier. The ability to adapt the environment and grade the skill level helped this participant develop a FMS that will help with engagement in future physical activity programs and participation in her daily life (Piek et al., 2012; Queensland Government, n.d.; Telama et al., 2005).

Activity of daily living skills. Clinical observations and a parent satisfaction survey support that the program goal related to activity of daily living skills, goal one, was achieved; the parents of 75% of the participants indicated that they noticed an observable change in their child's daily living skills on a parent satisfaction survey. One parent explained that her child had difficulty donning her shorts in the morning due to the fear of falling over while taking one foot off the ground. Graded activities in the gymnastics program, such as stepping over obstacles of different heights, taught the child how to safely pick one foot up off of the ground. This skill was then carried over into her home environment, supporting her ability to complete lower body dressing. Engagement in the gymnastics program supported her gain in FMS which impacted her ability to complete daily living skills (Piek et al., 2012).

Clinical observations revealed that 100% participants had a decrease in the amount of support required to complete a developmentally-appropriate fastener, such as a large button or Velcro. Each participant would attempt to don a child-sized cape with a fastener. This activity gave each participant the opportunity to work on dressing skills in a fun, interactive environment. The fastener could also be adapted based on their development; one participant, for example, successfully demonstrated the ability to don

and doff a 1 ½-inch button in three consecutive sessions. The fastener was then replaced with a smaller button in order for him to advance his skills and abilities in completing upper and lower body dressing.

All participants were encouraged to doff their shoes and socks at the start of each session. This gave the doctorate candidate the opportunity to work on lower body dressing skills at the start and upon completion of each session. One participant demonstrated 25% decrease in the amount of physical assistance required to don her shoes at the completion of the program, helping to promote engagement in daily living skills and independence in daily functioning (Kirk & Rhodes, 2011). Due to time restrictions and contextual limitations, the doctorate candidate was not able to address other ADL skills during the implementation of this program.

The PEDI indicated that 50% of the participants gained self-care skills upon completion of the program. Similar to results obtained in the PEDI mobility domain, parents might not have been able to recognize a small gain in ADL skills, such as the ability to complete a fastener with moderate assistance at the start of the program, compared to the ability to complete a fastener with minimal assistance at the completion of the program. These minute differences, though, are detected in clinical observations, reinforcing that engagement in the gymnastics program supported a gain in motor skills, which, in turn, supported a gain in ADL skills (Piek et al., 2012).

Communication and social skills. This program also addressed communication and social skills. The communication domain of the BDI and clinical observations support that the program goal related to social communication skills, goal two, was achieved. All participants demonstrated an increase in the communication domain of the

BDI. Change occurred in the personal social domain of the BDI for one participant. Two participants had observable change in the social function domain of the PEDI. The parent of two participants indicated that they noticed a difference in their child's social skills, supporting the results of the PEDI.

Change was observed in non-standardized clinical observations in these categories. One participant, for example, would not acknowledge his peers at the start of the program. He was noncompliant when asked to introduce himself to the group and demonstrated tantrum-like behaviors when asked to hold a peer's hand. He required constant support from his personal therapeutic support staff (TSS) that accompanied him for the duration of the program. Upon completion of the program, this participant was addressing each child by name, would ask others to participate in activities with him and recognized when a peer was missing from class; his TSS was only required for transitioning from one activity to the next. Engagement in this recreational activity supported his social relationship and communication skills with his peers, a skill that his parent identified as a challenge for him at the start of the program (Chien et al., 2017; Karachle et al., 2017; Woodmansee et al., 2016).

Another participant demonstrated a similar gain in skills. This participant required the support of her parent to engage with the group at the start of the program. Once she became accustomed to the instructors and the group activities, she participated in the activities but would not interact with her peers. She demonstrated parallel play as compared to her peers who demonstrated cooperative play with others in the group. After working on this skill with the participant in a supportive manner, the participant demonstrated the ability to independently ask a peer to participate with her in a warm-up

activity. She addressed the other participant by name and reached for his hand to invite him to join her in the gymnasium, a task that was very hard for her peer to complete. The peer responded well and they were able to engage in a warm-up activity together. Her parent was astonished when she heard what her daughter demonstrated. To her parent's knowledge, her daughter had never demonstrated the motivation or ability to invite a peer to play with her; she simply preferred playing by herself. Engagement in the gymnastics class motivated her to play with others, which was then reflected in her social communication skills.

Cognitive Skills. Only 50% of the participants demonstrated a significant amount of change detected in the cognitive domain of the BDI; therefore, program goal three related to cognitive skills was not achieved.

The participant that demonstrated the greatest amount of change in the cognitive domain of the BDI yielded the lowest score on the pre-test measure in comparison to his peers. Upon completion of the program his score was comparable to a peer of the same age, suggesting that engagement in the gymnastics program with peers of a higher cognition supported his cognitive development (Diamond, 2000; Zeng et al., 2017). The participant that had the least amount of change was the participant that did not attend the suggested amount of sessions, supporting that the frequency of intervention is important to demonstrate a noticeable change in skills and overall development.

Clinical observations during the gymnastics sessions support that 75% of participants demonstrated a change in cognitive skills. The participants, for example, understood that trampoline, their favorite activity, was always completed at the end of each gymnastics session. When the yellow cone was on the trampoline, the activity was

"closed" and they were not permitted to be on the equipment. The participants also became accustomed to the use of a visual schedule after three sessions; they understood that if they raised their hand, they would then be able to take a turn to remove an activity card from the visual schedule in order to transition to trampoline or the next activity. They remembered that they would be required to complete a fastener to don a super hero cape and sit on a designated line before they were permitted to take a turn on the trampoline. Participants gained this understanding quickly and complied to the adult-directives.

Three participants also demonstrated an increase in attention as evidence by their ability to listen to the instructors and attend to an adult-directed task. One participant, for example, demonstrated the ability to attend to an adult-directed task for one minute during the first session; he then became noncompliant and fled from the area the activity was being completed in. This participant demonstrated the ability to attend to the same task for three minutes during the last session, suggesting a two-minute increase in attention from the start to the end of the gymnastics program. When he lost interest, he signed "finished" and returned to his designed waiting spot rather than running away from the doctorate candidate. His attention and ability to state he was finished demonstrated an increase in cognitive skills that he did not demonstrate at the start of the program (Hseih et al., 2017).

Data also supports that there was a change in the number of step directions a participant could follow. Two participants initially demonstrated the ability to complete one-step directions. After engaging in gymnastics activities, both participants demonstrated the ability to follow two-step directions during at least four sessions. The

doctorate candidate was able to modify the number of steps and the demands of the task when giving a participant direction for completion of the activity. If the participants did not attend to the directions, they would not be able to complete the task successfully. This increased their attention to the demands, which then impacted their cognitive ability to attend to and follow multi-step directions (Diamond, 2000; Zeng et al., 2017).

Self-Confidence and Motivation Although not an indicated goal of the gymnastics program, an increase in a child's self-confidence and motivation impacts their overall competency to engagement in physical activities (Collins & Staples, 2017; Stodden et al., 2008). All participants demonstrated an increase in confidence to complete the gymnastics activities upon completion of the gymnastics program.

The gymnastics environment was easily able to be graded in order to adapt to each child's skills and abilities (Piek et al., 2012). A balance beam, for example, is typically four inches wide and four feet tall (U.S.A. Gymnastics, 2007). This size, however, is not supportive for all children; a child might not have the ability to walk heal-to-toe on the narrow surface or might be initially frightened by the elevated surface. Other size balance beams, though, were available to the doctorate candidate, allowing for each skill to be graded to the participants' abilities. This allowed for each individual participant to gain confidence in their abilities on modified equipment, which then motivated them to try the same skill on standard equipment. A wide, soft balance beam that was one inch off of the floor was utilized at the start of the program. Once each participant gained the confidence in their ability to walk on a modified beam, the doctorate candidate as able to slowly decrease the width and increase the height of the

beam, supporting a gain in motor skills, but also the gain in self-confidence and motivation.

Each participant also demonstrated a change in their self-confidence to participate in the group activities. One participant, for example, was noncompliant to engage in the gymnastics activities during the first two sessions. She hid behind the chairs and would not let her mother put her down to engage in the activities. She participated in the activities the second week of the program, however she would make all of her peers close their eyes, suggesting an insecurity with her skills and abilities. She would not let the doctorate candidate or the assistant help her, either, but demanded her mother's help instead. The following seven sessions she participated in 100% of each session without the support of her mother; she asked to go first and would show signs of excitement when she gained a new skill. She asked her family members observe her new skills during the last session and was proud of her accomplishments. The opportunity to participate in this program helped her develop confidence in her personal abilities (Piek et al., 2012; Stodden et al., 2008). Her parent stated:

> "it is so hard to find sports for [our child] to participate in that will accommodate for her disability and she has a hard time keeping up with her peers. It was great to see her participate without worrying that she'd be disappointed that she couldn't do it like the other kids" (anonymous, personal communication, August 10, 2018).

This phenomenon supports the developmental model by Stodden et al. (2008); she gained basic motor skills via gymnastics opportunities, which, in turn, helped her gain the competence and confidence to engage in other physical activities in the future.

Program Duration. Three of the four participants attended the recommended amount of sessions. One participant did not attend the recommended amount of sessions; this participant, participant four, did not demonstrated change in two of the four domains of the BDI and had the least amount of change in all four domains of the BDI when compared to the other participants in the program. This participant only demonstrated change in the social function domain of the PEDI; he did not demonstrate change in the other two PEDI domains. This child's parent reported that although he saw differences in his child's social skills, he did not observe differences in his child's motor, daily living, or cognitive skills. These outcomes and observations support the recommendation that a participant should attend at least eight of the ten sessions offered, as change was not detected in the standardized assessment, parent survey, or clinical observations if they did not attend the recommended amount of sessions.

Participants that attended the recommended amount of sessions demonstrated a greater amount of change on the BDI; parents of these participants also reported noticing change in their child's motor, daily living, social and cognitive skills upon completion of the program, validating the importance of attending at least 80% of the sessions offered.

Staff training program. The second discussion point is related to the outcomes of a staff training program on a gymnastics staff member's knowledge and confidence in instructing children with disabilities. The doctorate candidate was not able to draw conclusions of the effectiveness of the staff training program due to the lack of participation in the posttest assessment measure.

Pre-test data indicated that none of the gymnastics staff members in the staff training program were comfortable in instructing children with disabilities. This indicates

that increased staff education and training should be implemented at the Warren County Y in the future to increase the confidence and competence in teaching this underserved population (Dowey et al., 2007; Tierney et al., 2007). Gymnastics staff members also reported having limited opportunities to serve children with disabilities in the existing programs, suggesting decreased engagement of children with disabilities in the existing gymnastics programming at the Warren County Y (Chien et al., 2017; Woodmansee et al., 2016). Half of the participants reported being comfortable adapting the environment for children with disabilities, further suggesting that a gymnastics environment can be easily adapted to meet the skills and demands for each child to support growth and development (Piek et al., 2012).

Each staff member was aware that the outcomes obtained from the post-test knowledge exam were not meant to assess their knowledge, skills, or abilities, but rather measured the effectiveness of the staff training program to reach its intended goal and outcomes. Despite this explanation, zero staff members completed the knowledge exam or staff satisfaction survey. This could be due to fear that they would perform poorly on the post-test exam and the understanding that this result would not support positive outcomes of the program. The staff members were also aware that this program was one aspect of the doctorate candidate's capstone project. Negative program outcomes could have been viewed as the doctorate candidate "failing" at what she was trying to accomplish in the capstone project. The staff members might have chosen not to complete the post-test assessment rather than completing the exam with the potential of performing poorly. The doctorate candidate also had a personal relationship with all of the participants in the staff training program. This could have supported their nervousness

in completing the post-test measure in fear that the doctorate candidate would judge their knowledge, attention level or retainment of the information presented throughout the program.

Limitations

While this program contributes to the importance of engagement in recreational activities during childhood, this capstone project also had limitations that are important to address. It is expected that the results on the either the PEDI or the parent satisfaction survey are not reliable in the context of this project, as at least 75% of parents reported observable change in their child's motor, daily living, cognitive and social skills on a parent satisfaction survey, however change was only minimally observed in the parent-reported PEDI assessment tool. This difference could be due to a lack of understanding regarding the test items or their child's skills and abilities, as parent-report measures have limitations when gathering data (Taylor, 2017). This difference could also be due to the parent's desire to see change in their child's abilities, or a social desirability bias, making the parent satisfaction survey an inaccurate representation of a degree of change on each participant's developmental level (Althubaiti, 2016). All participants were relatively high-functioning, requiring a larger amount of change for change to be minimally detectable by the PEDI (Iyer et al., 2003). A slight amount of change, therefore, might not have been detected in the assessment tool but was instead detected in the parent satisfaction survey.

It is expected that some amount of change is due to a maturation of the participants in the gymnastics program. Change, in this instance, may not be due to the activities and opportunities provided by this program, but instead could be due to the

natural impact time has on each individual (Taylor, 2017). Although program participants were not engaged in other recreational activities or therapeutic services throughout the duration of this program, participants were engaged in supportive activities in their home or school environments, such as the engagement in a childcare camp at the Warren County Y. These additional programs could have an impact on the child's skills and abilities that were reflected in the assessment results. Change, therefore, is not due to the gymnastics program, but instead is due to the maturation of the participant or the outcomes of other activities the participant was engaging in.

The time of day the program was offered limited the number of participants that were available to participate; of the eight children that qualified for the program, only four (50%) were able to attend due to the time of day. This time also limited the number of staff members that could participate in the staff training program due to personal other commitments. The inclusion criteria regarding the age of the participants in the gymnastics program also limited the number of participants included in the program, as many families expressed interested but could not be included due the child's age exceeding the requirements of the program.

The involvement of the doctorate candidate is also a limitation on the results of this project. The doctorate candidate completed all individualized evaluations of each child and was the primary interventionist for the gymnastics and staff training program. This creates a potential bias in the results as the candidate was not blinded during the evaluation or intervention process. Rapport was built over time with the participants, making the participants in the gymnastics program comfortable interacting with the doctorate candidate, creating a bias for the posttest measures. Including an additional

individual to either complete evaluations or provide the intervention aspect of the program would help decrease this potential bias, making results more reliable and valid (Taylor, 2017).

Future Implementation

If this project were duplicated in the future, the following changes are recommended based on the outcome data previously discussed. Lessening the time impact on a family is one of the easiest factors to address in order to increase the participation of children with disabilities in leisure programming (King et al., 2003). Parents of eligible participants that did not participate in the gymnastics program suggested that future programming should be offered in the evenings or on weekend days, as many parents were not able to transport their child to and from the Warren County Y during daytime hours or their child was in other activities during that time. The Warren County Y should adapt the time of day programs are offered to accommodate to a working parent lifestyle and potentially increase the participation of children with disabilities in their offered programming.

The dosage, or the amount of sessions offered in the gymnastics program, should also be considered. Clinical observations revealed that changes in development were still occurring at the last gymnastics session, suggesting that ten sessions were not sufficient for each child to reach their maximum capacity of change. It is unknown if additional sessions would be beneficial, however the doctorate candidate suggests that future implementation explores the possibility of additional sessions further impacting a child's skills and abilities for each child to reach their greatest potential.

The involvement of a child's parent in the program could also add another outcome to the program. Although not an intended outcome for the gymnastics program, the doctorate candidate was able to observe changes in the parent upon completion of the program. Two mothers, for example, found that they were faced with similar challenges when caring for their child with a disability. While their child was engaging in the gymnastics program, the two mothers would talk and provide support for each other. Although total strangers are the start of the program, a friendship was developed which lasted long after the program was completed. A parent support group offered at the same time the gymnastics program is occurring could help to provide support to a parent who might not have a friend or family member that is faced with similar struggles or might not be aware of other community resources. This would provide a supportive environment for the parent to converse with similar parents, potentially impacting their peer supports, community engagement and willingness to enroll their child in similar programs in the future.

Incorporating the parent in the session could also add an addition outcome to the program. The parent, rather than the doctorate candidate, could assist the child in the gymnastics activities. Parent-training intervention would support the interactions between the parent and the child, the family dynamic and potentially increase the parent's ability to carryover what the child was learning in the gymnastics program to their daily routine and lifestyle (Lyons et al., 2009; McDiarmid & Bagner, 2005). Parent involvement would give the entire family an activity to participate in, allowing each individual person to benefit from the engagement in leisure activities. An increase in parent support could also decrease the amount of staff members necessary to carry out a successful program,

lessening the cost of participation. In the United States, many families of a child with a disability experience a financial worry due to their child's needs or condition. This could be due to therapy, school or travel costs; the inability of a parent to work full-time; medical care, such as a hospitalization or skilled medical services; or costs associated with respite care (Genereaux, van Karnebeek, & Birch, 2015). This financial burden deters the family from enrolling their child in leisure activities, as a lower income is associated with lower levels of participation (Anderson, Dumont, Jacobs, & Azzaria, 2007; Kuhlthau et al., 2005; Murphy & Carbone, 2008; Tonkin, Ogilvie, Greenwood, Law, & Anaby, 2014). In order to assure that all children with disabilities have the opportunity to engage in a similar program in the future, organizations should consider the potential for carryover and the financial advantage of having a parent act as their child's support.

Another consideration is the use of an inclusionary model to guide the gymnastics program. Although the program was successful in accomplishing two of the three goals related to the outcomes of the gymnastics program, the addition of children without disabilities that act as a peer model could offer support to the participants with disabilities (Jones & Schwartz, 2004). Peer modeling has a positive impact on social, motor and play skills for children with Autism Spectrum Disorder and developmental disabilities (Mathews, Vatland, Lugo, Koenig, & Gilroy, 2018; Jones & Schwartz, 2004). An introductory class could be provided for the children with disabilities in order to introduce the child to the program design. This group of participants could then be integrated into a class with typically developing participants. This model would help to

increase the opportunities for social interaction within the group, potentially increasing the outcomes related to social interaction skills.

One should also gain a better understating of the group characteristics of the staff members, including each person's academic motivation, attitudes toward the content and delivery system, and entry level skills. This information could help to adapt the learning content and instructional design to the specific target population, potentially increasing the amount of interest and the level of participation of each staff member (Dick, Carey, & Carey, 2015). An alternative style of assessment measure could also be implemented in replace of the knowledge exam. This could increase the participation of the staff members in the outcome measures, allowing the doctorate candidate to make inferences regarding the effectiveness of the program in achieving the program goal. An in-person competency completed with a peer, for example, could increase their level of comfort in the process, increasing the level of participation.

Lastly, the selection and incorporation of a learning theory, such as behaviorism, cognitivism, or constructivism, could help to create cohesiveness and support instruction in the staff training program. The use of a learning theory would give a "foundation for the selection of instructional strategies and allow for reliable prediction of their effectiveness" (Khalil & Elkhider, 2016, p. 147). This would account for the learner's characteristics, the instructional methods, and the context in which the instruction is occurring. The selection and utilization of a learning theory could increase the ability of the doctorate candidate to predict the outcomes of the staff training program (Khalil & Elkhider, 2016).

Summary

OT aims to address many aspects of a child's development, including motor, cognitive, communication, or play skills (AOTA, 2018a). Motor delays have a significant impact on a child's future, potentially limiting their physical, social, and emotional functioning throughout life, as well as their involvement in out-of-school sports or physical activities (Kirk & Rhodes, 2011; Temple et al., 2009). Children with disabilities do not participate in organized recreational activities or out-of-school physical activities as often as their typically developing peers (Chien et al., 2017; Woodmansee et al., 2016).

For typically developing children, gymnastics has been found to address motor competence, such as stability, bilateral coordination, and static and dynamic balance (Hseih et al., 2017). Using gymnastics techniques, in combination with the PEOP occupational therapy theory and the occupational therapy framework, the quality improvement project addressed motor, cognitive, social, and ADL skills via gymnastics opportunities while enhancing overall participation in leisure activities, in addition to addressing a gymnastics staff member's knowledge and confidence in instructing children with disabilities in the existing gymnastics classes.

This quality improvement project took place at the Warren County Y in Warren, Pennsylvania. The two components of this project were: 1) a gymnastics program for preschool-aged children with disabilities, and 2) a staff training program for the existing Warren County Y gymnastics staff members. The purpose of the program was to: 1) develop an adapted gymnastics program for children with disabilities with using an occupational therapy framework, 2) describe the benefits of a gymnastics program on a

child's global development, and 3) to identify the impact of a skills training program on a staff member's knowledge and confidence in instructing children with disabilities in gymnastics programs. The program utilized the PEOP theory to address each child and staff member's internal person factors, the external Warren County Y environment, and the occupation of leisure or work activities to impact each participant's occupational performance in their chosen meaningful roles (Cole & Tufano, 2008). Engagement in the capstone programs aimed to ultimately increase the involvement of children with disabilities in recreational activities at the Warren County Y and the Warren County community (Chien et al., 2017).

Two of the four goals of this program were achieved: goal one related to activity of daily living skills and goal two related to social communication skills via the gymnastics program. Goal three related to cognitive skills development and goal four related to the outcomes of the staff training program were not achieved. All participants in the gymnastics program demonstrated a positive change in motor and communication skills; at least one participant demonstrated a positive change in BDI score in each specific domain across all four domains. The primary parent or caregiver of each participant stated that their child enjoyed coming to gymnastics class each week. Their child talked about gymnastics to their family, siblings or friends and some demonstrated gymnastics skills in their home environment. The doctorate candidate was not able to draw conclusions of the effectiveness of the staff training program due to the lack of participation in the post-test assessment measures, including a knowledge exam and staff satisfaction survey. Pre-test data from the staff training program indicated that none of

the gymnastics staff members in the were comfortable in serving children with disabilities prior to engagement in this staff training program.

The results of this quality improvement project have implication for practice. Results suggest that engagement in a gymnastics program is supportive to the global development of a preschool-aged child. It also suggests that organizations and programs should make an increased effort to increase the engagement of children with disabilities in their recreational programs. Staff training programs should also be offered to staff members to increase the participation of children with disabilities in recreational activities at the Warren County Y.

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Appendix A

Needs Assessment Data Collection Strategies

Strategy	Description of Tool	Who	What	When
Key Informant Interviews	6-10 items, open-ended, semi-structured	CEO, Membership coordinator, Wellness Director, Direct Support Professional	Mission, vision, goals of the organization; population served; strengths, assets and needs Y	February 13-14, 2018
Observation- General YMCA	Observation guide used to direct observations	Time spent in the lobby observing people coming/going, tour of the facility and its resources	Population served, facilities offered	February 9, 2018
Observation- Gymnastics Classes	Observation guide used to direct observations	Staff, participants (age 3-14), parents, Direct Support Professional	Gymnastics programs, environment and equipment, population served, typical activities utilized	February 6 & 8, 2018
Observation- Rainbow Swim Program	Observation guide used to direct observations, informal conversation with a volunteer and participant	Volunteers, participants, family members	Population served, typical activities	February 16, 2018 5:30-7:00
Observation- Firefly Program	Observation guide, informal conversation with program director, program instructor, and participant	Program director, program instructor, participant	Population served, typical activities	February 7, 2018

Appendix B

Sample Data Collection Tools for the Needs Assessment

Interview Guides:

CEO:

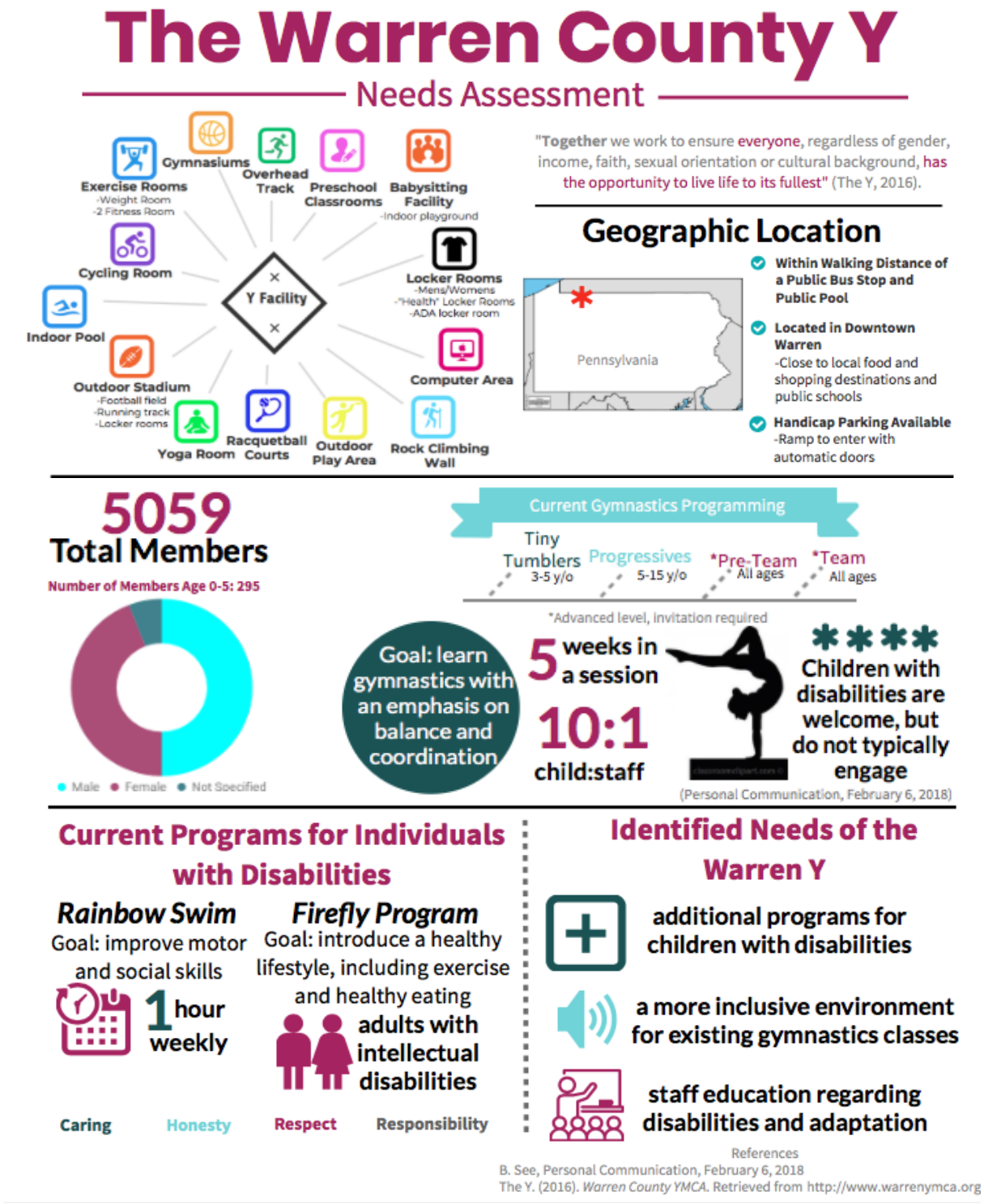
- Tell me about the Y's core values, mission, and vision.
- How is the Warren County Y meeting or exceeding these standards?
- Where do you see the organization in 5 years?
- What projects has the organization recently done to serve a larger population that you are proud of?
- What needs do you think the organization has? (programs, etc.)
- Who do you suggest I interview to better understand the organization and its needs?
- What do you suggest I observe over the next 2 weeks?

Membership Coordinator:

1. How many members does the Warren County Y have?
2. Tell me about the typical demographics for this group of clients (age, gender, etc.).
3. Is there any data on how many members have a disability? Is this data tracked? If so, how?
4. What projects has the organization recently done to serve a larger populating that you are proud of?
5. What needs do you think the organization has? (programs, etc.)
4. Is there any other information you feel that might be helpful for the purpose of my assignment?

Appendix C

Infographic Using Results from Needs Assessment



Appendix D

Key Studies Informing the Capstone Project

Citation	Study Purpose/Research Question	Design	Sample	Data Collection Strategies	Findings that Inform This Study
Chien et al. (2017)	Compare engagement in physical recreational activities between children with and without disabilities	Secondary analysis	50 children with IDD, 50 children typically-developing	-Parent-report questionnaire (CAP-Hand) -Parent-report demographic questionnaire -Developmental Profile-3 (parent checklist)	-Children with disabilities reported participating less in 8 physical recreational activities -Children with disabilities required more assistance in participating in the 11 identified activities -Parents of children with disabilities reported wanting their children to participate in more activities with less assistance
Collins et al. (2017)	Investigate physical fitness levels in children with IDD	Non-experimental	35 children with IDD, age 7-12	-Pre- and post-measures using the Brockport Physical Fitness Test, 10-week group program -Physical activity (PA) monitors worn	Key themes: -15 hours of structured programing addresses PA -PA improves motor skills and overall health in children with disabilities

					-Lifelong participation in PA is necessary to impact body composition
Culjak et al. (2014)	Investigate the effect of an 18-week basic gymnastics class on FMS and determine the correlation between a child's daily activities and FMS skill performance	Quasi-experimental	77 seven-year-old children	-FMS-polygon, Netherlands Physical Activity Questionnaire (NPAQ) -The performance of 8 gymnastics skills	-all gymnastics participants demonstrated increased performance in basic gymnastics skills -basic gymnastics skills and FMS can develop simultaneously -gymnastics skills transfer to FMS -basic gymnastics skills improve FMS -basic FMS lead to complex gymnastics skills
Cunha et al. (2018)	Evaluate and analyze the use of the Battelle Developmental Inventories (BDIs)	Systematic review	34 suitable articles	Search seven databases for articles in English, Portuguese, and Spanish	-Parents are typically involved in the assessment process -Culturally responsive, norm-referenced assessment -Requires standardized administration (observation, structured, and/or interview) -Screening Test available

Dowey et al. (2007)	Understand if a brief (1 day) staff training workshop had an impact on staff's behavioral understanding of challenging behaviors	Secondary analysis	54 front line staff members who engaged in a 1-day training session	Self-Injury Behavioural Understanding Questionnaire (SIBUQ) regarding challenging behaviors	-Participants demonstrated an increase in knowledge when before and after measures were compared -Brief trainings can impact a person's skills and behavioral response
Garcia et al. (2011)	Understand the influence of gymnastics training on postural control with and without visual stimuli	Quasi-experimental	Two age groups, age 5–7 and 9–11 years old	Center of posture calculated using computer software based on the ability to maintain a still upright stance with feet parallel and spaced apart, 30 second trials	-Younger gymnasts presented greater postural control compared to similar non-gymnast peers - Younger gymnasts displayed improved postural control with eyes open compared to eyes closed -Gymnastics training promotes improvements in postural control of younger children due to the use of visual information
Karachle et al. (2017)	Understand the effect of a 6-month Recreational Gymnastics (RG) program on the motor proficiency of children	Randomized Control Trial	Thirty-four children from Athens, Greece, age 3-7 years	Bruininks-Oseretsky Test of Motor Proficiency – Second Edition	-The experimental group significantly exceeded the control group in the post-test measurement -RG is an effective approach to

					enhancement MP in early childhood
Kirk et al. (2011)	Analyze gross motor interventions to understand the deficits in existing literature	Systematic Review	10 suitable studies (3 high quality, 7 low quality); 395 participants in study	- March 2010 to August 2010 in 6 online databases - Citations screened -Quality of study assessed -Risk of bias was assessed	-Interventions lasted 8-24 weeks -9 interventions significantly improved FMS -Utility of gross motor intervention supported for children with DD -Future research should include more robust designs, increased use of theoretical framework, and parent/teacher involvement in delivery
Ling et al. (2012)	Understand the effectiveness of psychoeducation on Autism, functional behavioral analysis, and the reaction to challenging behaviors on staff members who work with children with Autism	Randomized control trial	311 front line staff members who work in educational settings	- Attribution Questionnaire -Chi-squared tests and one-way ANOVAS	-1 session increased the staff member's knowledge regarding autism and their perceived efficacy -Continued staff training is essential to improve the quality of service delivered
Means et al. (2013)	Understand the learning outcomes of online and blended learning in comparison to face-to-face instruction	Meta-analysis	Students from various learning environments, range age 13-44 years	45 studies investigated	-Blended learning involved online and face-to-face learning which encourages participant interaction

					-Blended learning has positive learning outcomes
Hseih et al. (2017)	To investigate the cognitive-motor benefits, specifically spatial working memory, of gymnastics	Quasi-experimental	44 children (7-10 years old)	Match-to-sample test, HR monitor, activity logs, physical fitness assessments	-Gymnastics impacted spatial working memory at a behavioral and neurophysiological level -Exercise programs play an important role in cognitive-motor interactions and spatial cognition
Telama et al. (2005)	-Investigate the consistency of physical activity from childhood and adolescence to adulthood -Analyze how well physical activity variables measured in childhood and adolescence can predict adult physical activity	Prospective Cohort	-Data extracted from Cardiovascular Risk in Young Finns Study -2309 boys and girls age 3, 6, 9, 12, 15, and 18 years -Began in 1980, repeated measures in 1983, 1986, 1989, 1992, and 2001	Physical activity index (PAI) calculated via a self-report questionnaire	-Correlation lower in females than males -Persistent physical activity in childhood increased the odds of an active adult lifestyle
Temple et al. (2009)	Understand preschooler's physical activity during family child care and understand the difference in physical activity between males and females	Cross-sectional	65 boys and girls, preschool-age (mean age=4 y/o, SD=0.94); 49% female, 51% male	-Physical activity monitored during summer months via an accelerometer	-Young children are not active during times of child care -Child average 12.7 min of physical activity while in child care

				- The Affordances in the Home Environment for Gross Motor Development (AHEMD-SR) scale	-Boys more active compared to girls
Tierney et al. (2007)	Understand if typical challenging behavior staff training courses had an effect on a staff member's efficacy, negative emotional reactions and causal beliefs	Quasi-experimental	48 staff members attended a 3-day training	-self-report postal questionnaire -Challenging Behavior Attributions questionnaire (CHABA) -Emotional Reactions to Challenging Behavior scale -paired t-tests to compare scores pre-training and at 3-month follow-up	-3-day staff training impacted staff members' confidence and efficacy

Woodmansee et al. (2016)	Investigate the extent, context, experience, and preference for participation in out-of-school physical activities, comparing children with and without disabilities	Quasi-experimental	163 children with physical, intellectual, sensory or multiple disabilities and 163 typically developing children	-Children's Assessment of Participation and Enjoyment (CAPE) self-reported questionnaire -Demographic questionnaire -Non-parametric statistics and relative risk ratios	-Children with disabilities reported less participation in physical recreational activities -Children with disabilities reported less participation in preferred activities -Children with disabilities reported less involvement in daily independent physical activities (walking, running, etc.)
Zeng et al. (2017)	Analyze literature regarding the effects of physical activity on motor skills and cognitive development in preschool children	Systematic review	623 articles were identified, 15 RCTs	-Operational definitions -Databases: Academic Search Complete, Communication and Mass Media Complete, Education Resources Information Center (ERIC), Google Scholar, Medline,	-8 articles indicated significant improvements on motor performances -4 articles demonstrated positive effects on cognitive processes, including language, learning, academic achievement, attention, and working memory

				PsycInfo, PubMed, Scopus, Sport-Discus, and Web of Science	

Appendix E

Gymnastics Recruitment Flyer

Tumble tOTs

Program Description

Occupational therapy (OT): promotes health and prevents or adapts to an injury/disability to enable people to engage in daily activities (AOTA, 2018)

Purpose of this Program: teach children the basic skills of gymnastics with a focus on motor, cognitive, social and daily living skills using an OT framework

Requirements*

-Diagnosed with a Developmental Disability

-Age three to five

-Ambulatory

-Able to follow simple directions

-Able to complete toileting routine with minimal assistance from the caregiver

*Please call Cayla Leichtenberger for more details

References

American Occupational Therapy Association (2018). *What is occupational therapy?* Retrieved from https://www.aota.org

July 9 –

August 11, 2018*

***subject to change**

Hosted at the Warren County Y

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2 Classes per Week

Designed and Implemented by an Occupational Therapy Student

Free

WARREN COUNTY Y

212 Lexington Ave.
Warren, PA 16365

Cayla Leichtenberger, BS,
OTD Candidate

Appendix F

Participant Screening Questionnaire

Parent Questionnaire

Child's Name:

Parent's Name:

Age:

Birthdate:

Developmental Disability: _____

Able to follow simple, one step commands? (i.e. "stop", "wait", "go") __ Yes __ No

Toilet trained? _____ Yes _____ No

History of illnesses/surgeries: _____

Allergies: _____

History of seizures? _____ Yes _____ No

If yes, are there specific triggers?

Currently receive any therapy: _____ OT _____ PT _____ ST _____ Other

Additional information that would be helpful in working with this child (i.e. motivators, fears, likes/dislikes):

Appendix G

Program Goals

Goal 1: In 8 sessions, 75% of the participants enrolled in the gymnastics program will demonstrate a 10% decrease in assistance level when completing dressing skills, such as, but not limited to, don/doff LB clothing, footwear, UB clothing, etc. with unlimited verbal cues in order to support engagement activities of daily living.

a. Objective: In 3 sessions, 25% of participants will demonstrate a 10% decrease in assistance level when completing dressing skills, such as, but not limited to, don/doff LB clothing, footwear, UB clothing, etc. with unlimited verbal and visual cues in order to support engagement activities of daily living.
b. Objective: In 4 sessions, 50% of participants will demonstrate a 10% decrease in assistance level when completing dressing skills, such as, but not limited to, don/doff LB clothing, footwear, UB clothing, etc. with unlimited verbal and visual cues in order to support engagement activities of daily living.
c. Objective: In 6 sessions, 50% of participants will demonstrate a 10% decrease in assistance level when completing dressing skills, such as, but not limited to, don/doff LB clothing, footwear, UB clothing, etc. with unlimited verbal cues in order to support engagement activities of daily living.

Goal 2: In 8 sessions, 75% of the participants enrolled in the gymnastics program will demonstrate a 15% increase in social communication skills in order to support engagement in functional activities.

a. Objective: In 4 sessions, 50% of participants will demonstrate a 10% decrease in verbal, gestural, and tactile cues needed to introduce

themselves to the group at the beginning of the session in order to demonstrate increased social communication skills.

b. Objective: In 4 sessions, 50% of participants will demonstrate a 10% decrease in verbal, gestural, and tactile cues needed to ask for assistance during gymnastics activities in order to demonstrate increased behavioral regulation skills for social communication.

c. Objective: In 4 sessions, 50% of participants will demonstrate a 10% decrease in verbal cues needed to take turns during group activities in order to demonstrate increased social reciprocity skills for social communication.

Goal 3: In 8 sessions, 75% of the participants enrolled in the gymnastics program will demonstrate a 10% increase in cognitive skills in order to support engagement in functional activities.

a. Objective: In 6 sessions, 50% of participants will demonstrate a 20% increase in attention with no more than 2 verbal cues as evidence by their ability to attend to an adult-directed activity in order to promote increased engagement in functional activities.

b. Objective: In 6 sessions, 50% of participants will demonstrate a 15% increase in continuation skills with no more than 2 verbal cues as evidence by their ability to independent follow multiple-step directions in order to promote increased engagement in functional activities

Goal 4: In 4 sessions, 90% of gymnastics staff members that complete the staff training program will be able to identify 5 strategies that will support inclusive participation in order to serve a larger population.

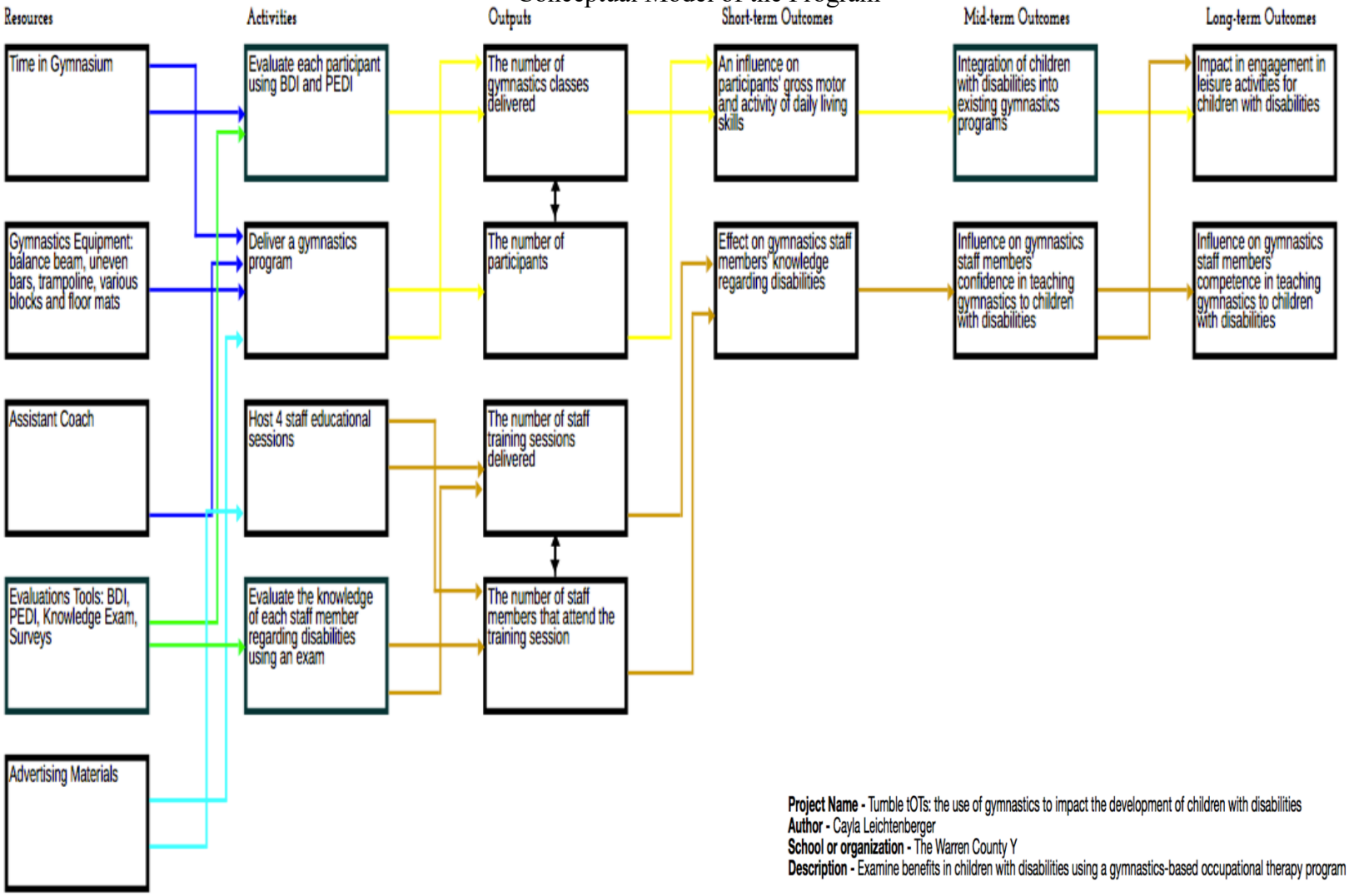
a. Objective: In 1 session, 50% of staff will be able to identify 3 strategies that will support inclusive participation in order to serve a larger population.

b. Objective: In 2 sessions, 65% of staff will be able to identify 3 strategies that will support inclusive participation in order to serve a larger population.

c. Objective: In 3 sessions, 75% of staff will be able to identify 4 strategies that will support inclusive participation in order to serve a larger population.

Appendix H

Conceptual Model of the Program



Appendix I

Sample Gymnastics Session Plan

Tumble tOTs: Outcomes of a Gymnastics Program for Children with Disabilities
Warren County Y

Instructor: Cayla Leichtenberger, Doctorate Candidate **Date:** July 10, 2018
Amy Castagnino, OTS (assistant)

Objectives: The first session will work on building rapport between the instructors and the participants. All participants will be introduced to the basic format of the class while having fun and engaging with their peers and instructors. Rapport built during this session will increase the quality of interactions between the participants, their peers and instructors.

Activities:

Activity	Time (45 min.)	Components	Purpose
Warm-up	5 min.	-musical carpets -duck duck goose -"color game" -retrieve bean bags and place in bucket -run down line on the carpet, place bean bag in bucket	-direction following -gross motor movement for warm-up -social interaction -taking turns
Stretch	5-10 min.	-arm circles -touch toes -pike -wrists	-range of motion -strengthening
Bars	5-10 min	-monkey across bars -touch toes to bar -swing with legs on bolster -walk feet up block in front of bar	-UB strengthening -core strengthening -motor planning -vestibular, proprioceptive input
Floor	5-10 min	-roll up/down wedge -jump in/out hoops -one-foot stance -forward roll down wedge mat -hand/foot hop up stacked blocks -(puzzles incorporated throughout)	-gross motor skills -balance/coordination -core strengthening -weight transfers -motor planning -UB/LB strengthening -tactile, vestibular, proprioceptive input
Trampoline	5 min.	-jumps -bounce on bottom -stick finish @ end	-core stability -core strengthening -motor planning -gross motor coordination
Wrap-up	5 min.	-parachute -game (see warm-up section)	(see warm-up)

Appendix J

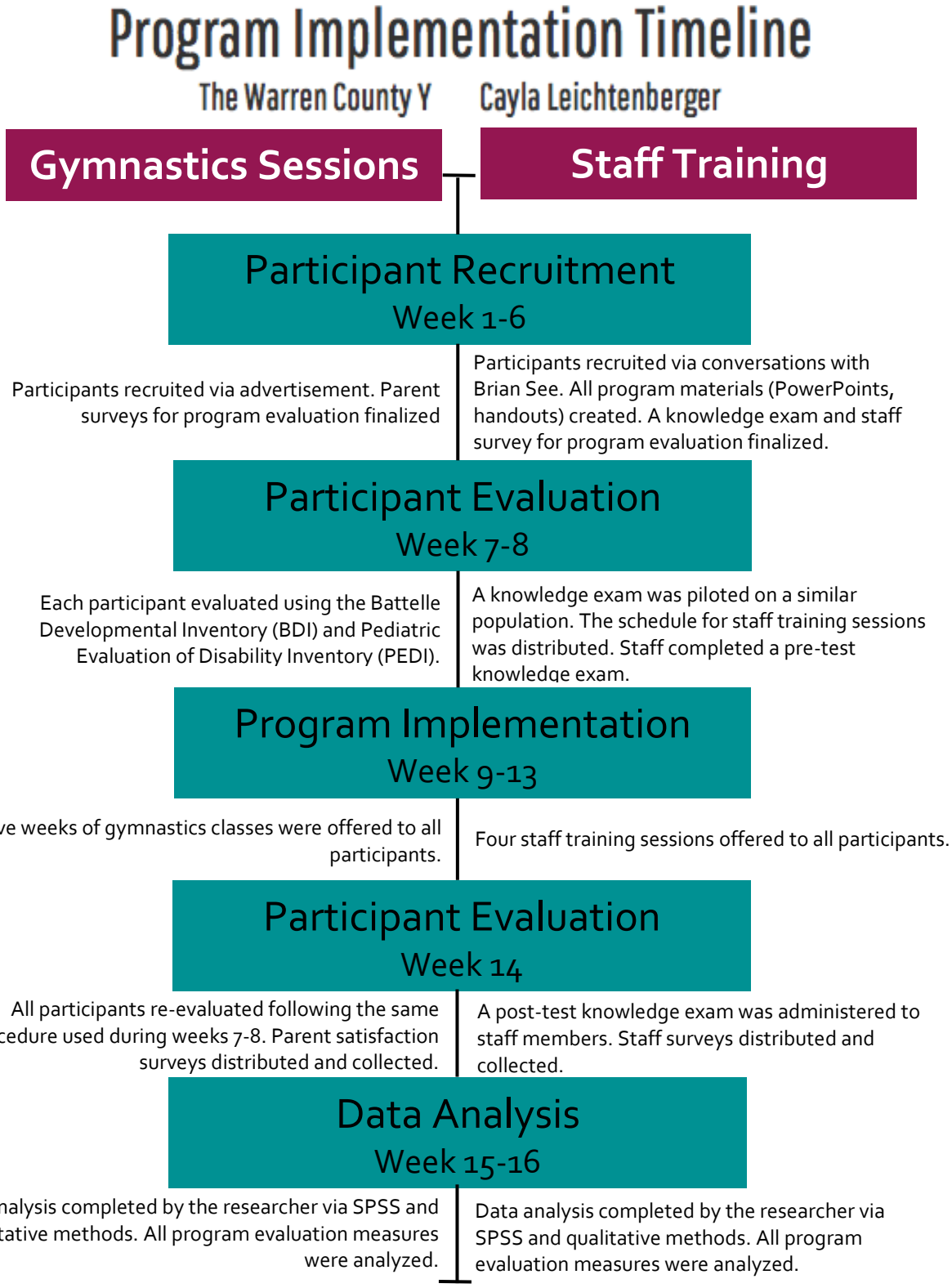
Sample Activities and Strategies Utilized


STOP


S
M

Appendix K

Program Implementation Timeline



Appendix L

Sample Gymnastics Equipment Utilized

Appendix M

Staff Training Knowledge Exam*

*Electronic format

1. Which of the following is the preferred language?
    a. Sam who has Autism
    b. An Autistic boy named Sam
2. There is one definition for "disability" that is used in the medical field.
    a. True
    b. False
3. Disabilities rarely impact one's body structures or functions.
    a. True
    b. False
4. Disabilities can be present at birth or develop over time.
    a. True
    b. False
5. Individuals with Autism always require a lifetime of direct support in order to live independently in the community.
    a. True
    b. False
6. Autism is four times more common in what gender?
    a. Male
    b. Female
7. Since the year 2000, the occurrence of Autism Spectrum Disorder Diagnoses has decreased.
    a. True
    b. False
8. Many children with Autism benefit from a schedule and predictable routine.
    a. True
    b. False
9. Hyperactivity and impulsivity are the most common ADHD symptoms seen in adolescence.
    a. True
    b. False
10. The term learning disability is an umbrella term, meaning many different disabilities are all classified as “learning disabilities.”
    a. True
    b. False

11. Of the following, which is classified as a learning disability?
    a. Attention Deficit Hyperactivity Disorder (ADHD)
    b. Cerebral Palsy (CP)
    c. Dyspraxia
    d. Autism Spectrum Disorder
12. Children with Down Syndrome tend to have other health-related problems, such as immune system complications, gastrointestinal issues and hearing problems.
    a. True
    b. False
13. Down Syndrome is classified as a genetic disability.
    a. True
    b. False
14. Fetal Alcohol Syndrome has:
    a. Physical Symptoms
    b. Behavioral Symptoms
    c. Both of the above
15. Medication can cure Fetal Alcohol Syndrome.
    a. True
    b. False
16. Children often exhibit behaviors due to events that are occurring in their personal life.
    a. True
    b. False
17. The environment has little impact on a child's behavior.
    a. True
    b. False
18. A challenging behavior is classified as behavior that:
    a. Interrupts learning and play
    b. Is harmful to the person or others
    c. Puts the person at risk for academic problems
    d. Puts the person at risk for social problems
    e. All of the above
19. Frequently changing staff members helps to decrease challenging behaviors, as children do not get "bored" with the same person every day.
    a. True
    b. False
20. Which of the following sensory stimuli make attending to an activity hard for children with Autism? (select all that apply)
    a. Noise
    b. Light

    c. Smell
    d. Temperature
21. Rewarding positive behaviors is not effective in decreasing challenging behaviors.
    a. True
    b. False
22. Preventing challenging behaviors is the most effective way to decrease behaviors.
    a. True
    b. False
23. Giving the child a sense of control is not effective to decreasing challenging behaviors.
    a. True
    b. False
24. If you give a child a choice, how many options is it suggested that you should you give them?
    a. 1
    b. 2
    c. 3
    d. More than 3
25. Desired and undesired activities should be alternated in order to motivate the child.
    a. True
    b. False
26. A game is only effective for learning if there is a clear winner, as opposed to everyone winning.
    a. True
    b. False
27. It is always better to have more activities and stations as compared to less, as it keeps a child's attention better.
    a. True
    b. False
28. Unstructured activities, such as "free time" at the beginning of the session, are always beneficial, as it gives the child time to explore and release energy prior to attending to activities.
    a. True
    b. False
29. Children age 3-5 can attend to a non-preferred activity for 10 minutes.
    a. True
    b. False

Case study video example

30. In the above video, in your opinion, what might the staff members do to decrease the child's challenging behaviors?

Appendix N

Sample Demographic Survey

Tumble tOTs

Participant Demographic Survey

Instructor: Cayla Leichtenberger, BS, Doctorate Candidate

The purpose of this survey is to provide demographic information of your child in order to assist the doctorate candidate in understanding the group to create an inclusive environment. Please complete the following questions:

Child's Name: _____

Parent/Guardian's Name: _____

Child's Age: _____

Child's Sex: _____

Child's Medical Diagnosis (select all that apply):

- Developmental Disability…... ☐
- Intellectual Disability…….. ☐
- Physical Disability……. ☐
- Autism Spectrum Disorder….. ☐
- Cerebral Palsy…….……. ☐
- Down Syndrome…..…… ☐
- Other, please specify: _____

Child's Ethnicity:

- African American……..…… ☐
- Caucasian…… ☐
- Chinese……. ☐
- Hispanic/Latino…….…….. ☐
- Indian……. ☐
- Other…….. ☐

Is your child a member of the Warren County Y?:

- No……. ☐
- Yes…… ☐

Has your child taken a gymnastics class before?

- No…….....☐
- Yes…… ☐
- If yes, please list location and duration: _____

Does your child currently attend school?

- No……. ☐
- Yes…… ☐
- If yes, please list location and grade level: _____

School your child does or will attend:

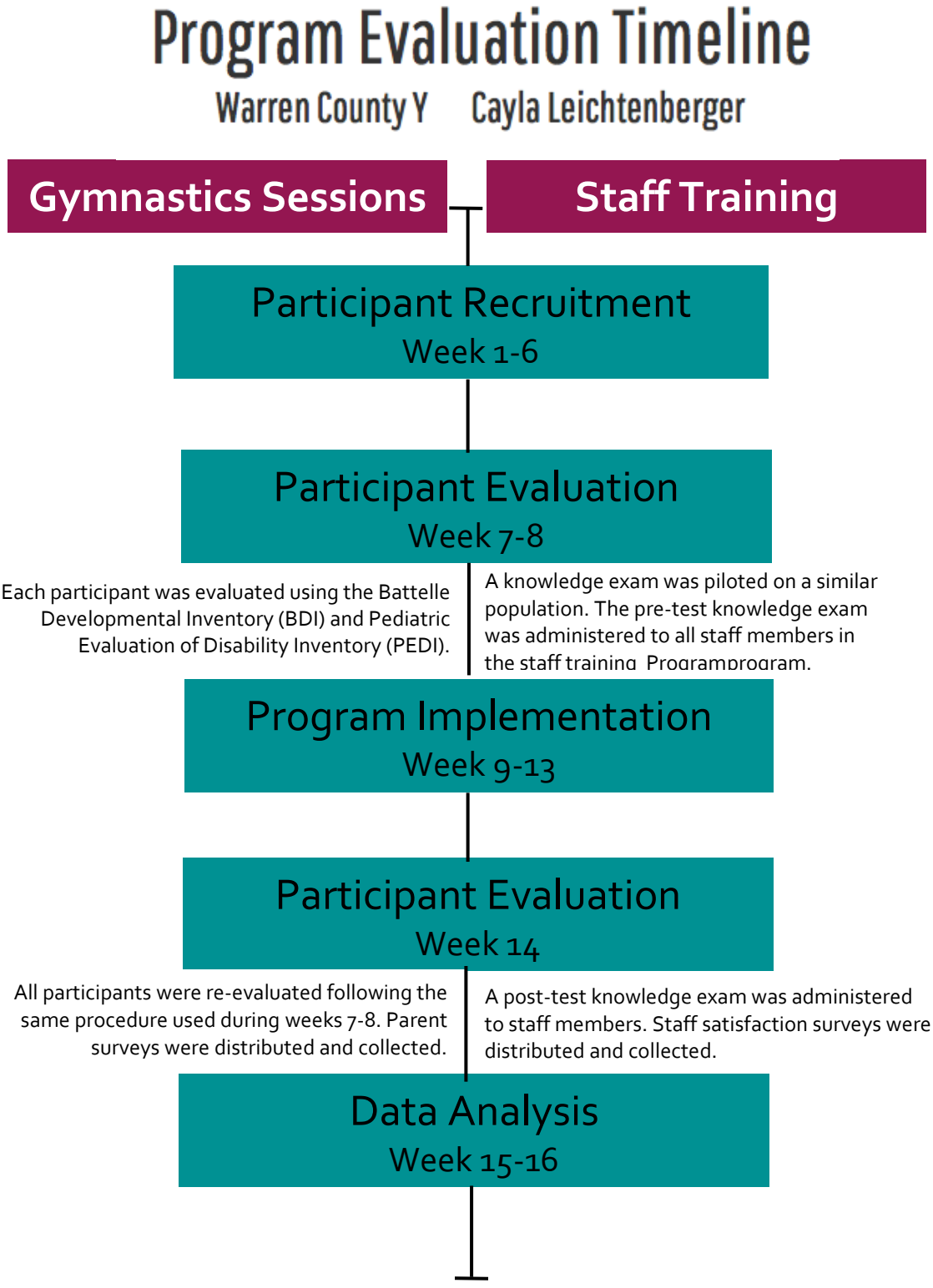
- Eisenhower…….☐
- Sheffield…… ☐
- Warren…..……. ☐
- Youngsville…… ☐
- Other…….....☐

Is your child currently involved in any other physical recreational activities (example: soccer, basketball, etc.)?

- No……. ☐
- Yes…… ☐
- If yes, please list sports or recreation activities: _____

Appendix O

Evaluation Process Timeline



Appendix P

Participant Satisfaction Survey

Tumble tOTs

Participant Satisfaction Survey

Instructor: Cayla Leichtenberger, BS, Doctorate Candidate

	Strongly Disagree	Disagree	Agree	Strongly Agree
Overall, the program was organized and well planned.				
The length of the program was sufficient.				
Overall, the instructor communicated well with myself regarding the program class times, requirements, etc.				
The instructor was enthusiastic when working with my child.				
The instructor was engaging with my child.				
My child enjoyed coming to gymnastics sessions.				
I noticed a difference in my child's gross motor skills (example: balance, coordination, etc.).				
I noticed a difference in my child's daily living skills (example: dressing, bathing, etc.).				
I noticed a difference in my child's cognitive skills (example: attention, following directions, etc.).				
I noticed a difference in my child's social skills (example: interacting with peers).				
I would recommend for other children to join the program.				
I feel as though this program is an asset to the Warren County Y.				

What I liked about the program:

What I did not like about the program:

What I would change about the program:

Other comments:

Thank you for completing this survey!

Appendix Q

Staff Satisfaction Survey

Tumble tOTs: Staff training

Staff Satisfaction Survey

Instructor: Cayla Leichtenberger, BS, Doctorate Candidate

	Strongly Disagree	Disagree	Agree	Strongly Agree
Overall, the program was organized and well planned.				
The length of the program was sufficient.				
Overall, the instructor communicated well with the participants regarding the program times, requirements, etc.				
The instructor was enthusiastic when instructing the group.				
The instructor was engaging with myself.				
I enjoyed coming to training sessions.				
I feel as though I gained knowledge regarding disabilities.				
I feel as though I gained knowledge regarding adapting gymnastics activities for children with disabilities.				
I feel as though I gain knowledge regarding behavior management strategies.				
I will use the information gained frequently in my future gymnastics programs.				
I would recommend for other staff to join the program.				
I feel as though this program is an asset to the Warren County Y.				

What I liked about the program:

What I did not like about the program:

What I would change about the program:

Other comments:

Thank you for completing this survey!

Appendix R

Sample Coding Sheet

Question	Do you feel as though your child benefitted from involvement in the gymnastics program?	
Participant	Response	1st Pass
1		
2		
3		
4		

Appendix S

Wilcoxon Signed-Ranks Test for the BDI and PEDI Assessment

Table 2

Wilcoxon signed-ranks test for the BDI and PEDI assessment measures

		N	Mean Rank	Sum of Ranks
BDI				
	Personal-Social			
	Negative Ranks	0	0.0	0.0
	Positive Ranks	1	1.0	1.0
	Ties	3		
	Total	4		
	Motor			
	Negative Ranks	0	0.0	0.0
	Positive Ranks	4	2.5	1.0
	Ties	0		
	Total	4		
	Communication			
	Negative Ranks	0	0.9	0.0
	Positive Ranks	4	2.5	10.0
	Ties	0		
	Total	4		
	Cognitive			
	Negative Ranks	2	2.0	4.0
	Positive Ranks	2	3.0	6.0
	Ties	0		
	Total	4		
PEDI				
	Self-Care			
	Negative Ranks	2	2.0	4.0
	Positive Ranks	2	3.0	6.0
	Ties	0		
	Total	4		
	Mobility			
	Negative Ranks	2	1.5	3.0
	Positive Ranks	1	3.0	3.0
	Ties	1		
	Total	4		
	Social Function			
	Negative Ranks	1	4.0	4.0
	Positive Ranks	3	2.0	6.0
	Ties	0		
	Total	4		

Appendix T

Table 3: Participant's Standard BDI T Score and PEDI Normative Standard Score Before and After Participation in the Gymnastics Program

Table 3

Participant BDI Standard Score (T) and PEDI Normative Standard Score Before and After Participation in the Gymnastics Program

	Participant					
	1	2	3	4	Mean	SD
BDI						
Personal-Social						
Pre-test	27.0	27.0	27.0	27.0	27.0	0.0
Post-test	27.0	34.0	27.0	27.0	28.8	3.5
Change	0.0	7.0	0.0	0.0	1.8	3.5
Motor						
Pre-test	29.0	29.0	34.0	43.0	33.8	6.6
Post-test	43.0	40.0	45.0	44.0	43.0	2.2
Change	14.0	11.0	11.0	1.0	9.3	5.7
Communication						
Pre-test	36.0	44.0	27.0	31.0	34.5	7.3
Post-test	48.0	46.0	42.0	40.0	43.8	3.9
Change	12.0	2.0	14.0	9.0	9.3	5.3
Cognitive						
Pre-test	36.0	40.0	32.0	37.0	36.3	3.3
Post-test	35.0	41.0	41.0	36.0	38.8	3.9
Change	-1.0	1.0	11.0	-1.0	2.5	5.7
PEDI						
Self-Care						
Pre-test	48.0	32.0	22.5	41.5	36.0	11.1
Post-test	46.2	41.0	42.2	32.0	40.4	6.0
Change	-1.8	9.0	19.7	-9.5	4.4	12.7
Mobility						
Pre-test	55.3	22.1	50.1	55.3	45.7	15.9
Post-test	42.9	44.7	43.4	42.9	43.5	0.9
Change	-12.4	22.6	-6.7	-12.4	-2.2	16.8
Social Function						
Pre-test	39.9	70.2	41.4	32.6	46.0	16.6
Post-test	49.2	53.0	37.5	36.1	44.0	8.4
Change	9.3	-17.2	-3.9	3.5	-2.1	11.4

Appendix U

Histogram of the BDI Domain Results